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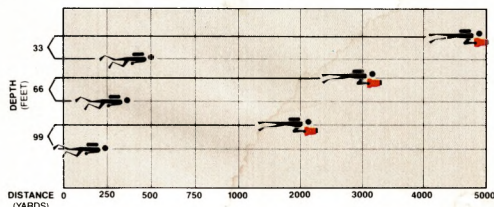
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skin diver

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COVER

In a 1:2 macro photograph, a yellow seahorse stands out in contrast to a dark background. When viewed against its natural surroundings the animal is much harder to see. For more, see page 52. Photo/Geri Murphy.

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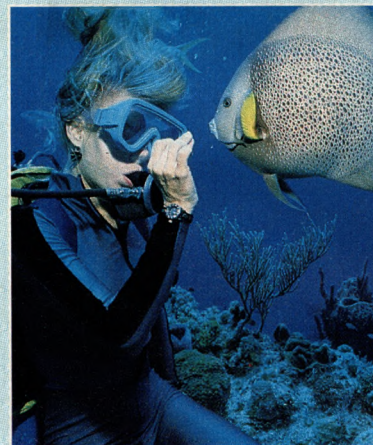
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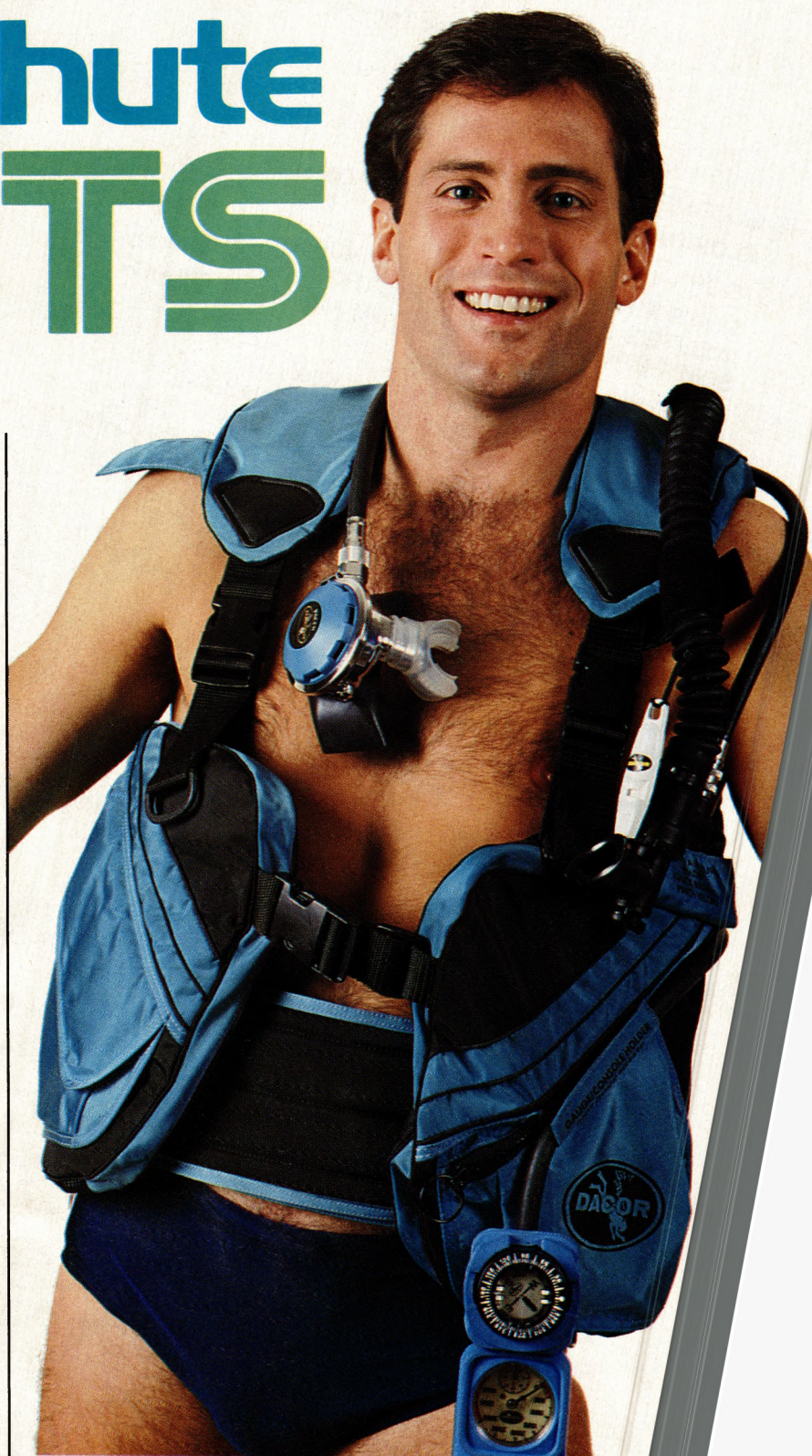
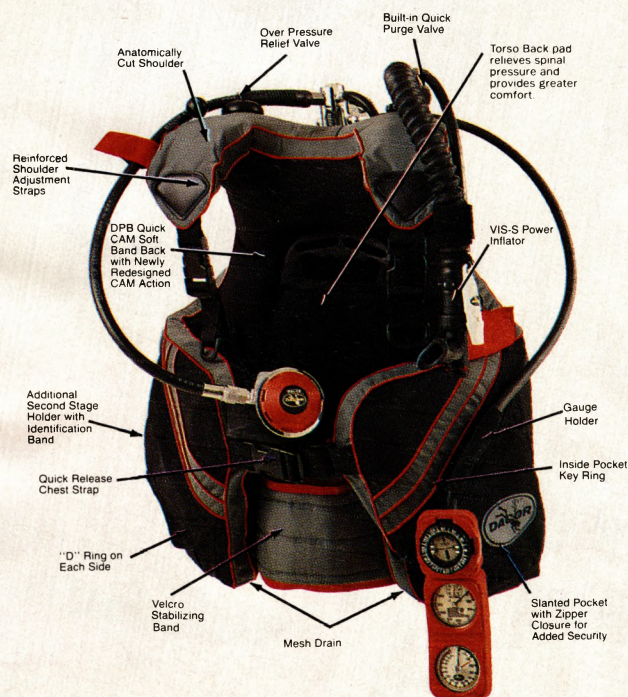
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SDM Editorial

BY BILL GLEASON

FINDERS WEEPERS, GOVERNMENTS KEEPERS

There's a legislative boxing match going on in Washington, D.C. most divers know little or nothing about. It's marine archaeologists in one corner and treasure salvors in the other. The only person likely to get punched or knocked out in this title fight is an innocent bystander; the American wreck diver.

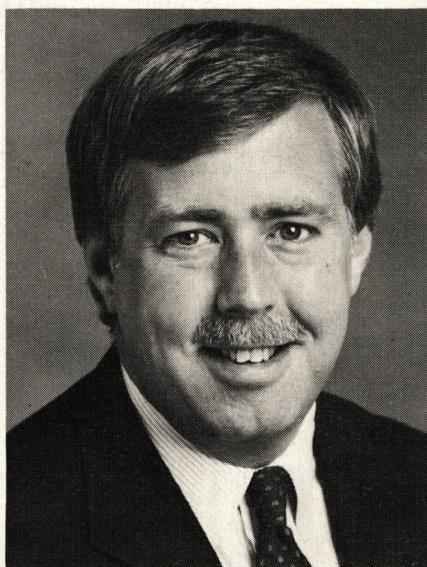
This boxing match comes to us in the guise of House of Representatives Bill 74 (H.R. 74), introduced by Congressman Charles Bennett of Florida on the very first day of Congress this year. Its Senate counterpart, S-858, was introduced by Senator Bill Bradley of New Jersey in late March. This is not the first time Congressman Bennett or others have introduced such a bill; 1984, 1985 and 1986 all saw unsuccessful attempts at legislative control of shipwrecks.

What's different with this year's bill? Well, the wording has been changed to "satisfy" the objections of wreck divers, who successfully fought, with others, to prevent previous legislation from becoming law. To quote Congressman Bennett in a Washington Times letter, "Previous legislation needlessly worried sport divers. Divers have now agreed on the language of my new bill." Most divers I polled hadn't even heard of the bill, much less agreed to it. That's when SKIN DIVER started to get worried. And, if you're a wreck diver and you haven't heard about this bill, it's time you got worried, too. You're in this fight whether you like it or not!

To understand this boxing match, you need a little background on Admiralty Law, the centuries old "law of the sea." Once a vessel has been abandoned, the first person to file an admiralty claim is given, in time, an "award" to work and salvage the wreck. This law applies to all shipwrecks out to the 200 mile territorial limit of the U.S. It's also known as "Finders keepers, losers weepers."

Marine archaeologists, on the other hand, look at ships as cultural resources, and say federal courts shouldn't decide who gets to salvage them, the states should determine that. Give the states title to shipwrecks out to the three mile limit, they argue, and we'll decide what to do with them, regardless of who finds them. This is known as "Finders weepers, governments keepers."

At this point, the bell for round one rings and the fight begins. Treasure salvors charge out of their corner, alleging



the state will control all shipwrecks and wreck divers won't be able to dive on a single wreck if H.R. 74 passes. Furiously counterpunching, the marine archaeologists say, "absolutely not," they're only interested in a small fraction of shipwrecks—those of great historic value—and won't deny wreck divers access to their wrecks at all.

Wreck divers, the innocent bystanders who don't even know about the bill, are being told by treasure salvors they'll be knocked out in the first round while the archaeologists say they won't lay a glove on us.

Who do you believe? I wouldn't believe either side. After all, while archaeologists and salvors are busy fighting, wreck divers are out diving and finding 80 to 90 percent of all shipwrecks. Wreck divers do cooperate with archaeologists and do share their finds with local and national museums. Under present Admiralty Law, we have the same chance to file a claim as an archaeologist or a treasure salvor. Giving either archaeologists or salvors more power than the clear majority (our estimates: 400,000 active wreck divers, less than 100 full-time marine archaeologists and less than 100 full-time treasure salvors) spells potential trouble for the future of wreck diving.

Does H.R. 74 safeguard access for wreck divers? Its proponents, as you might suspect, say "of course." SKIN DIVER, from the wreck diver's point of view, says "absolutely not." Regardless of good intentions on the part of the bill's sponsors, here's SKIN DIVER's analysis:

1. If H.R. 74 and S-858 are passed, each state will have the title to *all* abandoned shipwrecks in their waters out to the three mile limit. Despite its sponsor's interpretation, this law basically hands

the states broad, sweeping power over all shipwrecks, and the ability, with the help of the Secretary of the Interior, to designate any shipwreck as historic and severely limit access to it. How does giving a state title to shipwrecks benefit wreck divers? SKIN DIVER couldn't come up with a single benefit! But if you wait until you're told by your friendly state government (the same one that closes beaches to divers—have you tried diving your state parks and beaches lately?) that your favorite wreck site is now off limits, it will be too late.

2. The bills also charge the states to, "develop appropriate and consistent policies so as to . . . guarantee exploration of shipwreck sites." The bill does not make specific reference to what these policies should be, nor does it make this nebulous guarantee binding on the states. *But*, it most certainly gives the states the power to interpret this guarantee any way they see fit. Since we already have access to wreck sites, SKIN DIVER is firmly opposed to a federal law that allows states to determine what wrecks we dive on. While this is not the expressed intent of the bill, *the power is nonetheless given to the states*. At the very best, nothing changes. At any other level, wreck divers lose. Do you want to sit around and hope the states will act in wreck divers' best interests *after* they've been given the power to do anything they please with our wrecks?

If, like SKIN DIVER, you don't feel like giving up the freedom to decide what wrecks you may dive on, it's time to get very busy. Write the New Jersey senator who introduced S-858. His legislative actions to date on other issues appear to be fair and well intentioned. It's possible he just doesn't know the majority of wreck divers in the U.S. and, especially, in his home state, do not support H.R. 74 or S-858. Write: Senator Bill Bradley, U.S. Senate, Hart Building, Room 731, Washington, D.C. 20510; telephone (202) 224-3224. Send your own Congressmen a copy of the letter you send Bradley.

For additional information on opposing the bill contact the Atlantic Alliance, P.O. Box 27272, Central Station, Washington, DC 20038; (202) 231-3666.

H.R. 74 and S-858, or "Finders weepers, governments keepers" are the result of a long feud between salvors and archaeologists that has little to do with wreck divers. But the power conferred on the states could easily restrict the activities of wreck divers—the clear majority and innocent bystanders. Don't get knocked out in a fight you didn't even know about. Write that letter or call *today*: Maybe *tomorrow* we'll still be able to go wreck diving. 

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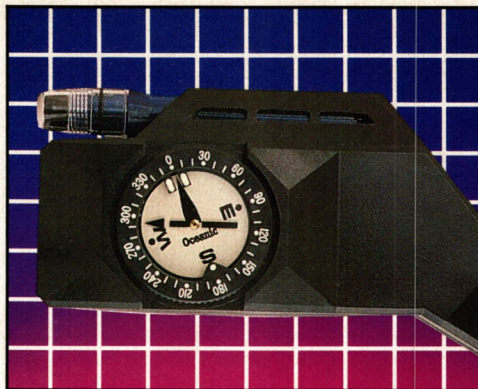
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Diver's Calendar

PACIFIC OCEAN GAMES

The Kingfish, Inc. and Los Angeles County Underwater Instructor's Association continue to host the first annual Pacific Ocean Games during **July-August** at various dive stores in the Southern California area. The games are a series of skin and scuba trials, with the funds raised to benefit the Catalina Hyperbaric Chamber. Divers will compete for prizes including dive equipment and travel.

For information contact Kingfish, Inc., 2305 Pullman Lane, Redondo Beach, CA 90278; (213) 374-1990. 📞

TEXAS TREASURE HUNT

The Texas Dive Association and The Scuba Centers will host their fifth annual Great Ark-La-Tex Underwater Treasure Hunt the weekend of **July 4** at Toledo Bend Reservoir. There will also be a fireworks display and dance. Proceeds from the event will be donated to the Divers Alert Network.

For information contact Texas Dive Association, 201 East Hawkins Parkway, Longview, Texas 75601. 📞

DAN BENEFIT BARBECUE

Sub-Aquatics is sponsoring a diver's barbecue **July 12** at Portage Quarry in Bowling Green, Ohio. Proceeds will be donated to the Divers Alert Network. There will be diving, boardsailing demonstrations and volleyball. Tickets (\$8) include quarry entrance fee and barbecue dinner.

For tickets or information contact any of the three Sub-Aquatics stores: Columbus, OH—(614) 864-1235; Pittsburgh, PA—(412) 531-5577; Cleveland, OH—(216) 467-5575. 📞

OLYMPIC TREASURE HUNT

The Elkhart Sport Divers are sponsoring an Olympic Treasure Hunt **July 19** during the Summer Special Olympics held at the University of Notre Dame in South Bend, Indiana.

For information on the event contact Jim De Broka, Prize Chairman, Elkhart Sport Divers, 301 North Byrkit Avenue, Mishawaka, Indiana 46544. 📞

LOBSTER ROUNDUP

Adventure Divers of Fort Lauderdale, Florida will host its second annual Lobster Roundup **July 20, 21, 25, 26**. There will be prizes for the largest lobster taken, most lobsters taken and most taken on a single dive—as well as second, third and fourth prize awards.

For information contact Adventure Divers, 923 SE 20th Street, Ft. Lauderdale, FL 33316; (305) 523-8354. 📞

GRAND ISLE TARPON RODEO

The Grand Isle Tarpon Rodeo Association will host its annual fishing rodeo (including a scuba division) **July 23-25** in Grand Isle, Louisiana. Trophies will be awarded in all divisions. For information contact R.D. Phillips (504) 749-3504 (days). 📞

RESCUE TRAINING COURSE

Plainsmen Search & Rescue of Baker, Montana will host a water rescue training course

July 24-26. The course is open to public safety, law enforcement, fire fighting and EMS personnel who work in water rescue, search and recovery. It will include class and fieldwork.

For information contact Darold Brown at (406) 778-2786 or Don Denning at (406) 778-2151, ext. 53. 📞

UNDERWATER ARCHAEOLOGY

Indiana University Scuba Research and Development will host an orientation to underwater archaeology program **July 25-26** in John Pennkamp State Park. The course will be followed by a two day optional field study (July 27-28) on a shipwreck in the park. Graduate level academic credit is available.

A field study on the shipwrecks of Grand Cayman Island will be held August 16-13. Graduate level academic credit is also available for this course. For information contact Charles Beeker, Indiana University Scuba Research and Development, Bloomington, IN 47405; (812) 335-1379. 📞

EXPEDITION AQUA-WOMAN

Long Island Divers Association will sponsor its seventh annual Expedition Aqua-Woman out of Freeport, Long Island **August 2**. Aboard the *Eagle's Nest*, 25 female divers will explore the wreck of the USS *San Diego*.

For more information contact Karen Gurian, Long Island Divers Association, P.O. Box 7304, Hicksville, NY 11801; (516) 798-1726 after 5:00 pm. 📞

GEORGIA TREASURE HUNT

Atlanta, Georgia area dive shops are sponsoring an underwater treasure hunt **August 9** for the benefit of the Save the Manatee Society. In addition to the treasure hunt, there will be onshore activities, watersports, exhibits and seminars. For information contact Save the Manatee Benefit, P.O. Box 76105, Atlanta, Georgia 30358. 📞

PENNSYLVANIA TREASURE HUNT

The third annual underwater treasure hunt to benefit the Divers Alert Network will be held at Dutch Springs Quarry, Pennsylvania **August 16**. For information contact Robert J. Burns, 2200 Bristol Road, Warrington, PA 18976; (215) 343-6970. 📞

ACCIDENT MANAGEMENT COURSE

A course on emergency management of diving accidents and hyperbaric chamber operations will be held **August 24-28** at the Catalina Marine Science Center on Catalina Island, California. Such topics as recognition and assessment of decompression sickness and air embolism, patient handling, helicopter rescue and chamber treatments will be covered. The University of Southern California will award continuing education credits to those completing the course. For information contact Catalina Marine Science Center, P.O. Box 398, Avalon, California 90704. 📞

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Scuba Quiz

Category: U/W Photography

Topic: Flash Units

By Dennis Graver

Flash units are essential for underwater photography. They bring subjects to life with color and can be a paintbrush for the photographic artist. To be effective, however, an underwater flash needs to be used and cared for properly. Check your understanding of this topic via this quiz. The answers are on the following page.

1. A rechargeable U/W flash should be stored with the batteries _____ and fired _____.

- ☐ A. Charged, three times monthly
- ☐ B. Discharged, when recharged
- ☐ C. Charged, only when submerged
- ☐ D. Partially discharged, weekly

2. A non-rechargeable U/W flash should be stored with the batteries _____ and fired _____.

- ☐ A. Removed, prior to next use
- ☐ B. As fresh as possible, twice monthly
- ☐ C. Removed, several times monthly
- ☐ D. In place, weekly

3. A good rule of thumb for determining which flash to use when the water is turbid is:

- ☐ A. The more turbid the water, the more powerful the flash
- ☐ B. The more turbid the water, the less powerful the flash
- ☐ C. The turbidity of the water is not a factor
- ☐ D. A flash unit should not be used in turbid water

4. Through-the-lens flash exposure control with the Nikonos V camera is a desirable feature because it:

- ☐ A. Helps ensure correct exposure
- ☐ B. Requires fewer camera setting changes
- ☐ C. Conserves battery power
- ☐ D. Does all of the above

5. To properly illuminate a subject underwater, the flash should be aimed:

- ☐ A. Where the subject appears to be
- ☐ B. Slightly behind where the subject appears to be
- ☐ C. Slightly in front of where the subject appears to be
- ☐ D. In the general direction of the subject

6. To ensure the flash is aimed properly, good photographers:

- ☐ A. Have models check the aiming of the flash
- ☐ B. Attach a small modeling light to the flash
- ☐ C. Check the aiming of the flash prior to every shot
- ☐ D. Do all of the above

7. After use, an U/W flash unit should be:

- ☐ A. Rinsed in clean, fresh water
- ☐ B. Soaked in clean, fresh water
- ☐ C. Soaked in fresh water and vinegar
- ☐ D. A and B and sometimes C

8. The user-serviceable O-rings of U/W flashes should be cleaned and lubricated prior to:

- ☐ A. Every day of use
- ☐ B. Every week of use
- ☐ C. Every dive
- ☐ D. Daily use or air shipment

9. The user-serviceable O-rings of U/W flash units should be:

- ☐ A. Cleaned and lubricated prior to storage of the unit
- ☐ B. Removed from the flash prior to storage
- ☐ C. Removed from the flash prior to air shipment
- ☐ D. All of the above are correct

10. For non-rechargeable strobes, the most flashes per set of batteries can be obtained with:

- ☐ A. Rechargeable nickel-cadmium batteries
- ☐ B. Heavy duty, carbon-zinc batteries
- ☐ C. Alkaline batteries
- ☐ D. Recharged carbon-zinc batteries

11. The most common cause of flooding of U/W flashes is:

- ☐ A. Improper sealing of primary O-ring
- ☐ B. Unit distortion owing to pressure
- ☐ C. Forgetting to seal the charging port
- ☐ D. Leakage around control knobs

12. When two flash units are aimed at the same subject, the exposure setting:

- ☐ A. Should be set for the most powerful
- ☐ B. Should be set for the least powerful
- ☐ C. Can only be determined with TTL exposure control
- ☐ D. A and C, but not B, are correct

13. To bracket manual flash exposure for close-up photos, the preferred method is to:

- ☐ A. Vary the lens aperture
- ☐ B. Vary the shutter speed
- ☐ C. Vary the flash-to-subject distance
- ☐ D. Do any of the above

14. To get the best performance from your U/W flash:

- ☐ A. Use batteries in sets based on brand and date of manufacture
- ☐ B. Fire the flash several times prior to use
- ☐ C. Use batteries made by the same manufacturer but with different dates
- ☐ D. A and B, but not C, are correct

Scuba Quiz

Answers: Flash Units

1. A. Charged, three times monthly.

A rechargeable flash requires attention monthly. The batteries discharge over a period of time and should be recharged monthly. The storage capacitor of the strobe should be kept at full capacity by firing the strobe several times.

2. C. Removed, several times monthly.

Non-rechargeable batteries left in a flash can produce gas or can leak, causing damage to the unit. Such batteries should be removed if the flash is to be stored more than two weeks. The flash should be fired several times monthly to maintain the full charge capability of the storage capacitor.

3. B. The more turbid the water, the less powerful the flash. A small, narrow beam strobe produces better results in dark, dirty water than a powerful wide angle flash. When working at close range with a large aperture, the light from a small, low power flash unit is more than adequate.

4. D. Does all of the above. Through-the-lens exposure control can be very effective because it senses the light actually reaching the film and controls the output from the flash. It is especially effective for close-up photos and conserves battery power.

5. B. Slightly behind where the subject appears to be. Because of refraction, objects underwater appear larger and closer than they actually are. Fortunately, your camera sees subjects in the same way your eye does. Unfortunately, however, your subject will not be properly lighted if you point your flash where the subject appears to be.

6. D. Do all of the above. A friend of mine who is an excellent photographer has the following message prominently displayed on his camera: "aim flash!" This is a good idea because many great pictures have not been taken because the light from the flash did not strike the subject. Modeling lights and helpful models are also good methods to improve flash aiming.

7. D. A and B and sometimes C.

Rinsing alone is inadequate for U/W photo equipment used in saltwater. A minimum of 30 minutes of soaking in clean, fresh water is recommended, followed by a low-pressure rinse under warm water. A very small amount of vinegar may be added to the rinse water occasionally to help dissolve deposits.

8. A. Every day of use. Your camera and flash system components should be disassembled daily and the O-rings serviced. This action greatly reduces corrosive build-up and the possibility of flooding. Avoid distractions when working on underwater photo equipment.

9. D. All of the above are correct.

The main reason for lubricating O-rings is to keep them from drying and cracking, so they should be lubricated prior to storage. O-rings tend to flatten during prolonged storage, so it is best to remove them when storing your equipment. Pressure changes during shipment can produce a vacuum inside your flash if the O-ring is left in place.

10. C. Alkaline batteries. For non-rechargeable flashes, alkalines are the best batteries to use. Nickel-cadmium batteries provide faster recycling and higher efficiency at low temperatures, but produce fewer flashes than alkaline cells. Be aware that batteries are drained much more quickly by continuous use than by intermittent use.

11. A. Improper sealing of primary O-ring. Photographers have a tendency to pay more attention to the O-rings on their cameras than to those on their flashes. All O-rings deserve equal attention. Several popular flash units are difficult to seal owing to the O-ring. Maintain pressure on the seal manually while closing the locking devices on the flash. Dunk test the flash for leaks before descending.

12. A. Should be set for the most powerful flash unit. When dual flashes of unequal power are used, the exposure setting is determined by the more powerful unit. When flashes of equal power are aimed at the same point, the exposure is one aperture setting smaller than for either flash alone. TTL exposure control is possible with dual strobe units when a special sync cord is used.

13. C. Vary the flash-to-subject distance. Depth of field is limited for close-up photos, so the smallest possible aperture is used constantly. To bracket exposure, the flash is moved closer to or farther away from the subject. The flash only needs to be moved inches to have a significant effect.

14. D. A and B, but not C, are correct. Purchase the newest and freshest batteries possible. Batteries on sale typically do not meet this criteria. Have and use a battery tester, which is inexpensive and extremely useful. Do not mix brands of batteries or use batteries with different model numbers. Also, avoid mixing old and new batteries. Do fire your flash several times prior to use to enable the storage capacitor to take a full charge.

If you are an underwater photographer, you should have done well on this quiz. Well means 10 or more correct answers. If you have not yet discovered underwater photography, you can probably sense how challenging this wonderful activity is. It is also extremely rewarding. You can learn a great deal about flashes by reading the excellent instruction manuals provided with the units, but the best way to obtain good results quickly is to take an underwater photo specialty course.

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Did you hear the one about the two divers exploring a shipwreck together? One is older, experienced and wily. The other is a young, brash, upstart. Inside the wreck, both take off their swim fins so they won't stir up the silt. As they gradually make their way through the ship, they spot an eight foot shark cruising around in one of the compartments. When the old diver starts to put on his fins, the younger one grabs him and writes on a slate: "Why are you putting on your fins? You can't outswim a

copter basket-hoisting a crewman to safety while the *Oriental* was sinking.

Robert Marx, author, marine archaeologist and salvor, has run into bureaucratic opposition from the National Park Service in his attempt to salvage a 16th century Spanish galleon off Point Reyes, California. The *San Agustin*, one of a fleet of four galleons sailing from Manila to Acapulco in 1595, went down in Drake's Bay—now part of Point Reyes National Seashore Park. National Park Service representatives approached Marx at an

archaeological convention in Sacramento last year and asked him to work on the *San Agustin*. Marx agreed to attempt to salvage the galleon's treasures and artifacts, relinquishing one-third of them to the State of California and one-third to the National Park Service.

One month later, officials of the park service changed their minds and demanded a contract calling for 100 percent of everything found! A park service officer threatened to arrest Marx if he set foot again on the beach where wooden planks, rusting metal and ballast stones have washed ashore. Marx had picked up and examined these items (he didn't take any) when he was told to leave. He was further warned about disturbing an archaeological site in a federally supervised area.

Marx filed an admiralty arrest with the U.S. District Court in San Francisco, a move that essentially stakes a claim on the site. The case challenges the park service's authority to bar salvage operations of sunken vessels in a one-quarter mile zone of Drake's Bay. Officials of the State of California are willing to work cooperatively with Marx if he wins his admiralty claim. Neither the state nor the federal government has the funds or the personnel to salvage the *San Agustin*. Marx, one of a small number of underwater archaeologists in the U.S., has salvaged shipwrecks throughout the world for more than 30 years.

Ronald Stern, Miami, Florida and Gregg Millett, Huntington Beach, California asked about the Civil War ships, CSS *Hunley* and USS *Housatonic*. When the
(Continued on Page 35)



Wreck Facts

BY ELLSWORTH BOYD

shark!" The older diver grabs the slate and writes: "I don't have to outswim the shark. I just have to outswim you!"

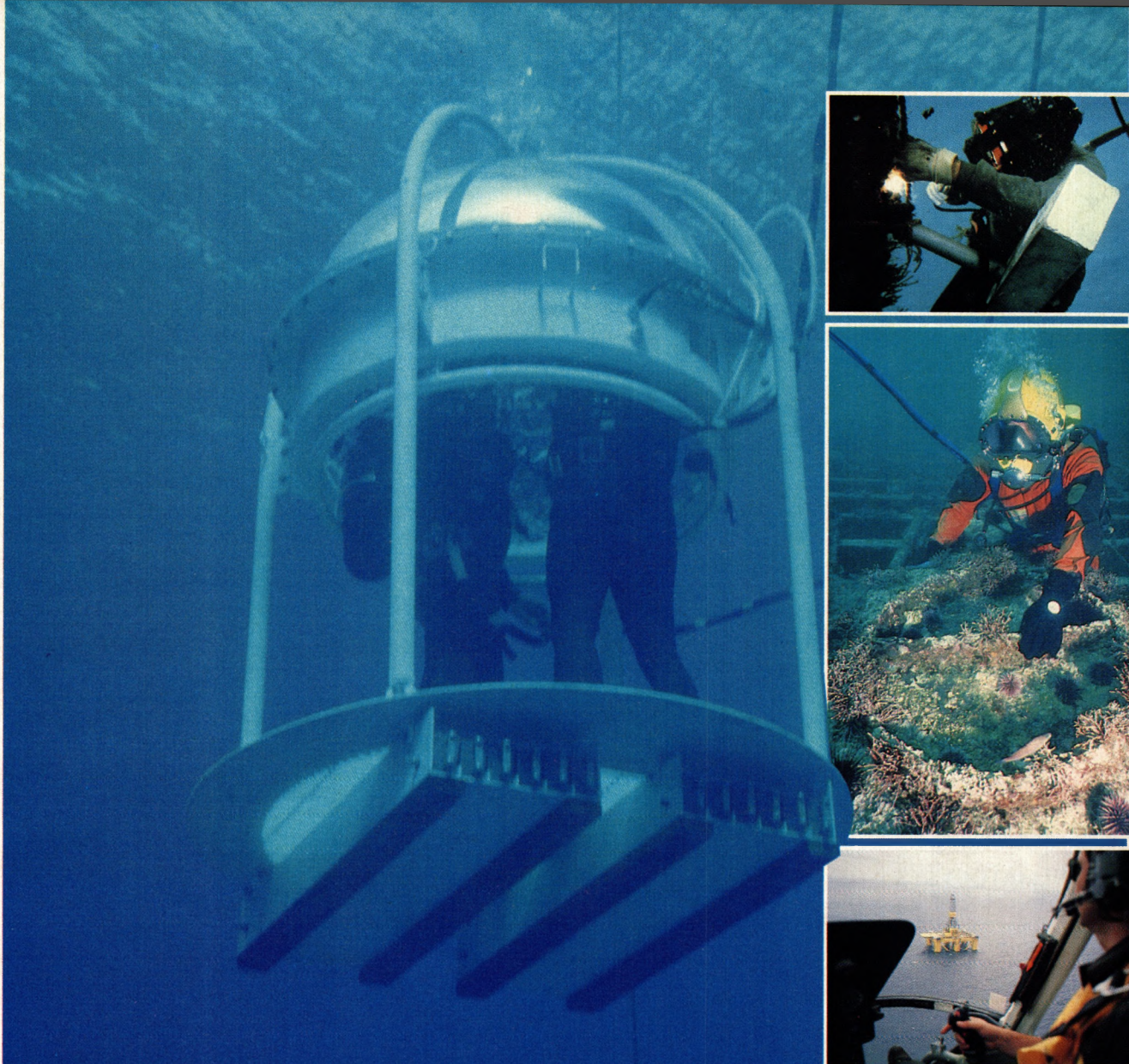
I don't know if this story has a moral, other than reinforcing the axiom, "Always dive with a buddy." Exploring shipwrecks can be lots of fun, especially if your buddy is as enthused about them as you are.

Jim Robbins, Raleigh, North Carolina was enthused when he discovered a wreck in shallow water just outside the surfline near Oregon Inlet. He says most of the things he retrieved were scattered all over the bottom and appear to be from a fishing vessel. There are many fishing boats wrecked off North Carolina, Jim, especially in this area on the Outer Banks near Nagshead. You may have discovered the remains of the 85 foot fishing trawler, *Oriental*. She foundered and broke up when she grounded in heavy surf on Oregon Inlet Beach, December 21, 1969. The vessel reportedly served as a private yacht of Adolph Hitler during World War II. Aycock Brown took a dramatic photo of a U.S. Coast Guard heli-

A U.S. Coast Guard helicopter basket-hoists one of the men from the grounded *Oriental*.



photo/courtesy U.S. Coast Guard



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Diving Medicine

BY ALFRED A. BOVE, M.D., PH.D.

Many return from an ocean dive with a sting or rash, the result of contact with a stinging marine animal. In the South Pacific, some of these can be dangerous. In April 1986, the Australian Institute of Marine Sciences held a symposium to learn more about marine stings. Our colleagues in the South Pacific Undersea Medical Society (SPUMS) recently published a review of the Stinger Symposium in the SPUMS journal (July-September 1986).

Along the coast of Queensland, Australia, there is a dangerous jellyfish known to cause death to swimmers who contact it. This is the sea wasp (*Chironex fleckeri*). To understand the problem with sea stings, you must understand how the animals produce them.

NEMATOCYSTS

All stinging marine animals have microscopic capsules called nematocysts. These contain small darts with a toxin that is released when the nematocyst is stimulated. Contact with a jellyfish tentacle causes many millions of nematocysts to be deposited on the skin. They are not all stimulated at the same time, many remain on the skin awaiting stimulation. Contact with a nematocyst-bearing animal produces an initial sting that is often followed by continuous stings from nematocysts still on the skin. The initial sting is usually the worst because the contact triggers many nematocysts. In the case of a sea wasp, this dose of toxin can be lethal, as it has millions of nematocysts.

SEA WASP INJURY

The sea wasp is described as a box jellyfish (cubomedusa) because it is square, with one tentacle at each corner of the square. Envenomation by a sea wasp causes toxicity to nerves, heart and the blood cells, as well as damage to the skin in the area contacted. Stings with the sea wasp can cause respiratory paralysis, but a victim can be saved by mouth to mouth resuscitation. The venom is rapidly broken down in the body and does not usually last more than 30 minutes. If respiration can be supported for that long, the victim will survive. The other severe damage that occurs is in the skin, where scarring may occur.

When a swimmer is injured by a sea

wasp, there is usually time to get to the beach. It is there respirations stop—owing to the poison—and mouth-to-mouth is needed. A diver in deeper water is in more danger because paralysis of breathing will result in drowning if help is not provided. In Australia, an antivenin for the sea wasp sting is available and will be given if a victim is brought to a hospital. Another Australian box jellyfish, the morbakka, also produces severe stings, but is not as dangerous as the sea wasp.

IRUKANDJI

This is another toxic jellyfish found in the Pacific around Australia. When it contacts the skin, local pain is not immediate,

photo/Bonnie J. Cardone



"All stinging marine animals have microscopic capsules called nematocysts. These contain small darts with a toxin...."

but after 15-30 minutes intense pain in the area of the sting occurs and a marked rise in blood pressure is noted. Accompanying symptoms also include headache, cold extremities and reduced urine output. These symptoms are suggestive of a massive adrenalin release caused by the toxin. Early recognition of the sting of this jellyfish is difficult because the pain and the skin reaction are minor. The local pain occurs later and has symptoms similar to cramps.

PORTUGUESE MAN-O-WAR

These jellyfish are common in most of the warm seas of the world. They drift on the surface with the wind, aided by an inflated sail that also serves as an air filled float. The sail is often a striking royal blue. Beneath it is a cluster of tentacles that can be 15-20 feet long. These trail

beneath the sail to sting small fish that wander into them. Swimmers, and sometimes divers, can accidentally touch these long streamers. Severe pain and skin injury is the result. There have been a few deaths from the Portuguese man-o-war, but not directly from the toxin in the nematocysts. The victims usually had another illness—such as heart disease—that was aggravated by the toxin. Contact with a small segment of a tentacle (with probably millions of nematocysts) will cause severe skin reaction but the toxin is not usually strong enough to threaten the life of a healthy diver or swimmer. A massive contact, however, can cause a serious illness.

OTHER MARINE JELLYFISH

Contact with most other species of jellyfish will not cause a serious problem either with the skin or otherwise. The sting is annoying and can produce skin responses that usually heal without permanent scarring. This same response is true for fire coral, stinging hydroids, marine hard and soft corals and anemones.

TREATMENT AND PREVENTION OF STINGS

Stings can be prevented by wearing protective clothing. Peter Fenner describes the following garb used by lifeguards in Queensland, Australia: "... two pairs of pantyhose, as used to be worn by the northern lifesavers, is just as effective [as the newer stinger suits] although not as aesthetic! One pair is used normally, with the feet cut out (otherwise they fill with sand) and the others are worn upside down with a head hole cut in the crotch and the arms fit into the legs of the pantyhose."

It is obvious that divers and swimmers take skin protection seriously in Australia. Hands should be protected from fire coral and other stinging corals with gloves. The thickness of the covering needs to be about that of nylon stockings; elaborate cover is not needed. Many of the box jellyfish swim near the surface in the evenings. On night dives, don't linger near the surface and search the water with your light for these small transparent jellyfish. There is a box jellyfish in the Caribbean that produces a sting, but it is not dangerous. Caution is still worthwhile. Stinging corals, hydroids, anemones, etc. are also avoided by proper buoyancy (avoid bouncing along the bottom).

Treatment of the local sting involves destroying the untriggered nematocysts. Over the years, ammonia solution, meat tenderizer, rubbing with sand and fresh water have been recommended. Sand and fresh water both trigger the nematocysts, so if you want an extra thrill from your jellyfish contact, rubbing sand on the area, or pouring fresh water on it will produce the extra stings. Present advice is to use plain white vinegar to destroy the nematocysts.

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Florida Lobster

TEXT AND PHOTOGRAPHY BY GREG JOHNSTON

I am by no means a great lobster hunter. For most of my diving life, I thought bug snatching meant cleaning the bottom of a swimming pool. It wasn't until after I'd lived in south Florida for several years that I learned about lobster hunting. Since my initial introduction to lobstering, I have been unsuccessful at trying to shake the uncontrollable fever known as "bug plague." However, frustrating as it is, each year, like many of my diving colleagues, I passionately search for the elusive Florida crawfish.

In Florida, lobster season officially opens on July 26 and there is a two day mini-season July 19 and 20. During this time there are so many boats on the water a person could probably walk across the decks from Miami to Jacksonville without ever getting wet.

But still, I don't quite understand bug fanatics. They will spend hundreds of dollars outfitting themselves in the newest scuba gear only to crawl under rocks and inside caves to hunt for bugs.

It's a funny thing, but for me it never seems to fail. I can dive just about anywhere in Florida and see lobsters literally crawling the bottom. But, when lobster season opens, sure enough, they all seem to have taken a vacation. Call it what you want, their instinct or my inexperience, but trying to catch these crustaceans is a real challenge.

Any diver who has tried to grab a spiny lobster and come up with a handful of antennae will agree, bug catching is not easy. A lobster's only defenses are to shed its legs and antennae and wedge itself tightly into a

LOBSTER FRITTERS

- 1 egg, beaten
- 1 tsp. melted butter
- 1 T flour
- ½ C milk
- 1½ T Madeira wine
- ¼ tsp. tarragon
- Dash of salt and pepper
- ½ C lobster meat, coarsely chopped
- Bread crumbs, crushed
- 1 T white vinegar
- Oil

Melt the butter in a saucepan. Add flour and milk and cook over low heat until sauce thickens. Remove from heat and stir in egg, wine, vinegar, tarragon, salt and pepper. Add lobster meat and refrigerate for 15 minutes. Form into patties, dip in bread crumbs and cook lightly in oil until golden brown.

LOBSTER STIR FRY

- 1 large wok
- Oil
- Assorted vegetables
- 1 C lobster meat, chopped and cooked
- Garlic
- 1 lemon, juiced
- 1 onion, chopped

Coat wok with oil. Add pre-cooked lobster, sprinkle with garlic and juice from lemon. Add vegetables and stir. Serve over rice.

BROILED LOBSTER TAIL

- 1 large lobster tail
- Melted butter
- 1 lemon
- Garlic salt

Split lobster tail and place on broiler pan meat side up. Brush meat generously with melted butter, lemon and garlic. Place in broiler about four inches from heat for 10 to 12 minutes or until meat is lightly browned. Serve with rice.

A woman with brown hair and blue eyes, wearing a black one-shoulder top, is holding two diving instruments. In her right hand, she holds a black circular console with a red button and a white label that says 'TUSA'. In her left hand, she holds a pink regulator with multiple gauges and a compass. The background is dark and textured.

We've made some new advancements in air and see power.

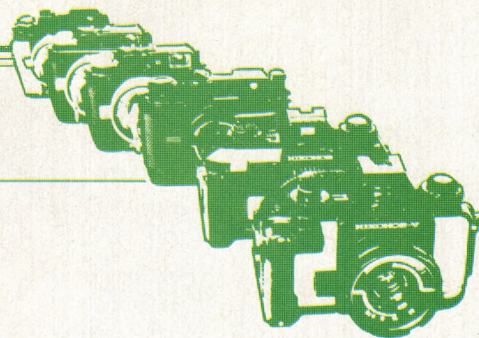
Once again, Tabata's superior innovations make diving easier.

Just one look at Tabata's new Liberator SCA-5ODX console and you can see that we've got a whole new slant on convenience. Since the housing is angled, all it takes is a turn of your wrist for an instant status report. What's more, we put the compass where it belongs: up on top with the easy-to-read PSI, temperature and depth gauges. There's even a handy aluminum emergency knife hidden on the back.

Like the console, the new Liberator TR-200 regulator comes in a variety of Tabata's famous hot colors. And it features a purge slide-lock which relieves pressure on the demand valve during storage. Rated at 4000 PSI, the TR-200 has a 360° swivel top plus two high pressure and four low pressure ports.

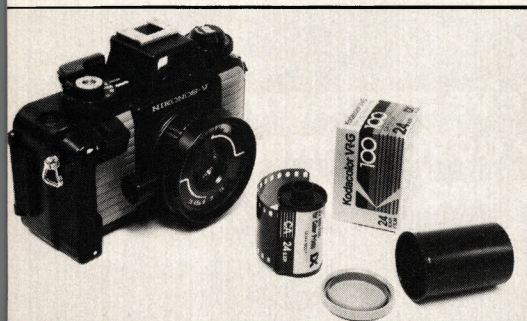
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LESSON VI: Getting Started-Shooting In Air

TEXT AND PHOTOGRAPHY BY GERI MURPHY



The best way to get acquainted with your Nikonos V is to shoot film on land.

Before taking your camera underwater you should shoot one or more rolls of film on land. This exercise will help acquaint you with the Nikonos V controls and basic operation.

As for location, you can shoot this roll of film just about anywhere; on the beach, on the dive boat, around town or in your own backyard. Your subject matter and location are not as important as *learning how to shoot*.

First, make a list of the shots you wish to take. They should include long shots (at infinity), medium shots (5 to 15 feet) and close range shots (2.75 to 4 feet). Also, plan on taking a few shots in shaded areas as well as in strong sunlight. This type of list will help you become familiar with the basic skills of focus and framing, as well as available light exposures with both bright and dim lighting.

For this exercise you can select either color slide or color print film, depending on the processing available and what type of results you desire. The advent of one hour mini labs makes the processing of color print film extremely easy and convenient. You can see the results the same day you shoot the pictures. This type of speedy processing will greatly help you analyze both your mistakes and successes, as you can easily recall how each picture was taken and compare it to the results.

On the other hand, you may wish to choose a color slide film if you are staying at a resort or on a live-aboard boat where E-6 color slide film processing is available. You can often see the results the next day.

SETTING THE FOCUS

Perhaps the most challenging aspect of Nikonos V operation is the accurate estimation of camera-to-subject distance and the adjusting for proper focus. This is especially critical in dim lighting since depth of field is greatly decreased.

In the beginning you may find it helpful to measure the distances with either a tape measure or by pacing. After you use this method for a few rolls of film, your ability to accurately estimate distances will greatly improve.

Once you have estimated the distance from camera lens to the mid-point of the subject you intend to shoot, set the focus scale for that specific distance. Simply turn the silver focusing knob on the lens

until the distance is lined up with the point on the stationary part of the scale.

OBTAINING THE BEST APERTURE

The next step is to set the aperture for the best possible f/stop. If you recall (last month), we had initially set the shutter speed dial at "A" (automatic) and the aperture for f/5.6 as part of the film loading process. Now we want to check the lighting to see if we can use that setting or perhaps obtain an even better f/stop.

You can accomplish this task by using the camera's automatic exposure system much like a light meter. Hold the viewfinder up to your eye and depress the shutter release button halfway. This will activate the electronics system of the camera. If it is a bright, sunlit day with no

SHOT LIST

NIKONOS PHOTOS IN AIR

Long Shots

- ★ Sunset
- ★ Building
- ★ Beach Scene

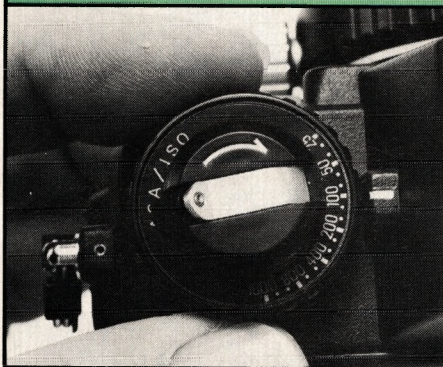
Medium Shots (5 to 15 ft):

- ★ Car
- ★ Boat
- ★ Cyclist

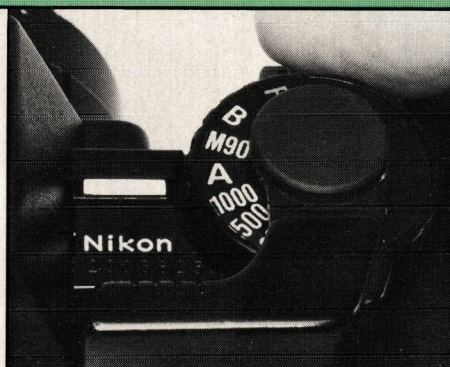
Close Shots (2.75 to 4 ft):

- ★ Sign
- ★ Friend
- ★ Pet Cat
- ★ Pet Dog

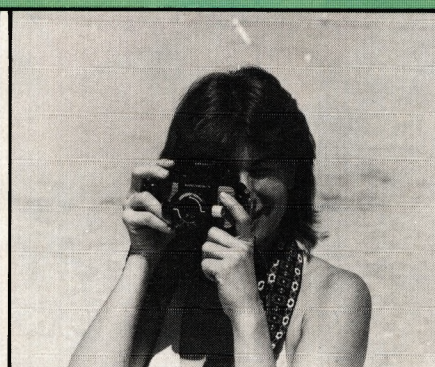
Once the camera is loaded, set the film speed. In this case it is 100 for Kodacolor VR-G 100 (see photo above).



Check the shutter speed dial on your Nikonos V to be sure it is set on A for automatic exposure. Reset it if necessary.



Hold the camera with the viewfinder up to your eye so that you may properly frame your subject in the index marks.



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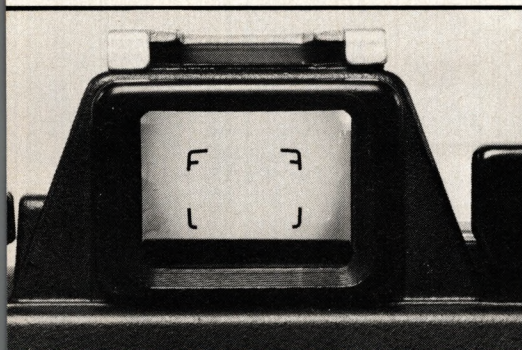
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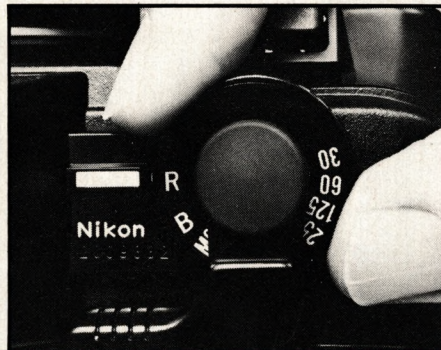
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Your subject should fill the frame as much as possible—as long as you are no closer than 2.75 feet from your subject.

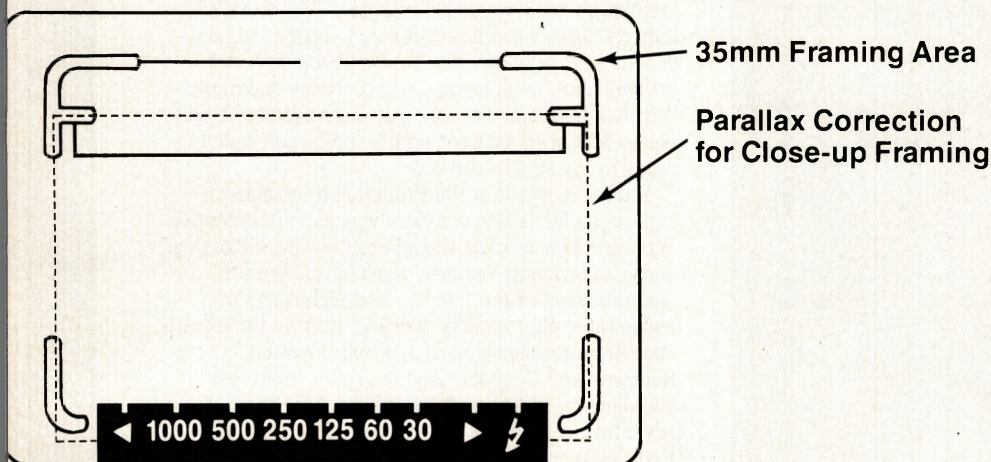


Readjust the focus distance scale to correspond with the estimated distance from camera lens to subject.



When you have used all your film and the lever will no longer advance, turn the shutter speed dial to R for rewind.

VIEWFINDER



clouds, the shutter speed setting may be as high as 1/250 or 1/500 second.

If you are shooting a stationary subject such as a person or a tree, a fast shutter speed is not necessary. The picture could be taken at a speed of 1/125 second. This means you could adjust the lens aperture for f/8 or f/11. Doing so will be to your advantage since these smaller apertures will increase the depth of field and thus, sharpness.

You should check the shutter speed setting each and every time prior to

shooting a picture. Lighting conditions are likely to change, particularly if you are moving from a bright area to a shady area, or if a cloud should obscure the brilliant rays of the sun.

FRAMING

Once you have set the focus and obtained the optimum aperture, you need to concentrate on framing your picture. Move the camera until the subject you intend to photograph is positioned in the center of the viewfinder.

The corners of the rectangle in the viewfinder mark the outside edges of the picture area of your 35mm lens. Regard these lines as though they were the corners of a picture frame and attempt to place your subject within the center.

If your subject does not completely fit within this frame you will have to back away until you achieve the right distance. Remember to re-estimate your distance and adjust your focus knob to accommodate it.

You will notice the picture frame has a double set of lines at the top corners. The lower lines are used for close-up pictures taken at a distance of three feet. This is known as parallax correction.

SHOOTING THE PICTURE

One of the secrets to successful photography is holding the camera steady. This is important to avoid blurred pictures. The best way to steady the camera is to cradle it in your left hand while operating the shutter release button with your right index finger. Hold the camera up to your face so your eye is close to the viewfinder and then slowly squeeze down on the shutter release button with a steady and even pressure. When you do this right, the click of the shutter will come almost as a surprise.

To rewind, lift up the film rewind knob and begin rotating it slowly in a clockwise direction as indicated by the directional arrow.



Shoot photos of subjects in the shade as well as in the bright sunlight. This will help you understand how the camera functions in low light conditions.



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NIKONOS COURSE

Once you hear the click of the shutter you can then advance the film to the next frame by cranking one full stroke of the film advance lever with your thumb. This lever travels a full 144 degree arc and you should move it through the entire arc to achieve a complete picture frame advance in one stroke.

When all available frames have been exposed the lever will stop advancing. This is your signal that it is time to rewind the film and exchange the exposed roll for a fresh one.

UNLOADING THE CAMERA

Once you have reached frame 36 (or 24 or 12) or the film advance lever stops advancing (whichever comes first), it is time to rewind the film. First, set the shutter speed dial on "R" for rewind.

Next, lift the film rewind knob and rotate it slightly in the direction of the arrow to secure it in the raised position. Once engaged, fold out the rewind crank and start turning it slowly and evenly in the direction of the arrow (clockwise). When you feel the tension lessen, continue winding one or two more turns to be sure the film is completely into the cartridge. A roll of 36 exposure film will take approximately 32 turns to fully rewind. A roll of 24 exposure film requires 22 turns and a roll of 12 exposure film requires 14.

One word of caution. Always rewind film in a Nikonos on land. Never attempt to rewind the film while underwater. The uneven rotating pressure against the rewind crank shaft O-ring can cause minute leakage that will eventually result in corrosion inside the camera.

Once the film is fully rewound, you can open the back of the camera in the same manner you did when loading the film. Remove the cartridge of exposed film, reset the shutter speed dial on M90 and you are ready to load the camera with fresh film.

A SECOND ROLL OF FILM

After seeing the results of your first roll of film, you will be eager to shoot another roll and continue your familiarization with this marvelous camera. By all means repeat some of the key successes of your first roll and correct whatever errors you have made. The most likely ones will be in the area of picture framing and sharp focus. These two areas require careful attention for each and every frame.

NON-AUTOMATIC EXPOSURES

You may also wish to shoot a few pictures in the camera's non-automatic mode. Start by selecting a specific shut-

(Continued on Page 34)

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TEKNA'S Spectra-Fin

CANDY COLORS AND A LIFETIME WARRANTY

BY JIM WALKER

Lemon, cherry, blueberry, mint, watermelon and licorice—you look at a selection of Tekna's Spectra-Fins and you're reminded of a candy store. I probably shouldn't admit this, but while I was looking at the watermelon fin for the first time, I caught myself checking to see if it smelled like watermelon candy. Hey, at least I didn't bite it!

The Spectra-Fin is available with the blade in a choice of five transparent colors plus opaque black. While watermelon is the official color label of that fin, the others are actually cobalt blue, citrine yellow, candy apple red, aquamarine and jet black. These colors exactly match those of Tekna masks and snorkels. And, if you were only in the market for fins, you could select a pair that would complement any gear you already possess.

In addition to color, the Spectra-Fin in-



photos/Bonnie J. Cardone

corporates a racy modern design that goes beyond good looks. At 22 inches long and 9.5 inches wide, the fin is large enough to provide a good power stroke, yet small enough to be used by smaller divers. Its foot pocket is available in medium (size 7-9) and large (size 9-11). The blade material is a snappy, lightweight, elastomeric compound designed to efficiently translate kicking energy into propulsion. And, Tekna indicates this material provides ten times the abrasion resistance of other plastic fins. The blade is angled for the most dynamic propulsion and has two large side ribs and two mid-ribs to provide strength and efficiently channel water.

The Spectra-Fin blade is securely bonded to a soft, black, elastomeric foot pocket. Tekna is so confident of the blade and footpocket materials that it gives a

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One of the best features of the Spectra-Fin is its strap/buckle system. The heel strap has a tab with raised dots for a good grip with gloved fingertips. The strap also has ridges that allow the fin buckles to grip it securely and hold adjustment. The outermost of these ridges on each end of the strap is a stop block that won't pass through the buckle. Thus, you won't find the fin strap coming out of a buckle in the midst of an adjustment.

The fin buckles themselves, Tekna's Strap-Loks, swivel so the heel strap can be moved down, the foot slipped into the fin, and the strap pulled back up over the heel. You won't have to stretch the strap back nearly as far as you would with non-swiveling buckles.

The buckles are made of high impact structural resin and stainless steel. They are extremely easy to operate. To tighten or loosen a fin strap, merely press in on the dot-textured, spring-loaded tab, then pull the strap either direction. The strap can also be tightened with just a pull on one of its ends. The buckles have a neat, swept-back design without any protrusions that might snag on kelp, etc.

The Spectra-Fin has a suggested retail price of \$84.95. It and other dive gear can be color matched at your Tekna dealer. For information contact Tekna, 101 Twin Dolphin Drive, Redwood City, CA 94065-1086; (415) 593-1410.

The Spectra-Fin—candy colors, rugged, efficient design and a lifetime original owner warranty: The only thing missing is the flavor! 

NIKONOS COURSE

(Continued from Page 30)

ter speed such as 1/125 second. Again, peer through the viewfinder and depress the shutter release halfway. If you have the correct aperture for the selected shutter speed 1/125 will appear on the display as a steady red numeral and there will be no other numbers flashing. However, if there is another number flashing you will have to readjust the aperture control knob until there is only a steady red 1/125 LED display. You may wish to attempt a few shots at 1/60 and at 1/250 simply to familiarize yourself with the manual exposure mode system.

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in ascending the staircase of skills for underwater photography. Knowing how to operate the Nikonos V on land will be of tremendous assistance in your future photo excursions underwater. You are now ready to ascend to the second step—underwater macro photography. 

WRECK FACTS

(Continued from Page 20)

Confederate submarine, *Hunley*, attacked the Union gunboat, *Housatonic*, off Charleston, South Carolina in 1864, it initiated a new concept of naval warfare. The *Housatonic* was the first ship ever sunk by a submarine in actual combat. Unfortunately, when the torpedo struck the gunboat, the explosion popped the seams and rivets in the submarine and both ships went down together. The *Housatonic* lost five men, while the *Hunley* lost its entire crew of eight. I found detailed information about this historic encounter in *Shipwrecks of South Carolina and Georgia*, by Lee Spence. In November 1970, Spence discovered wreckage from both vessels in shallow water, about three and one-half miles from his home in Sullivan's Island, South Carolina.

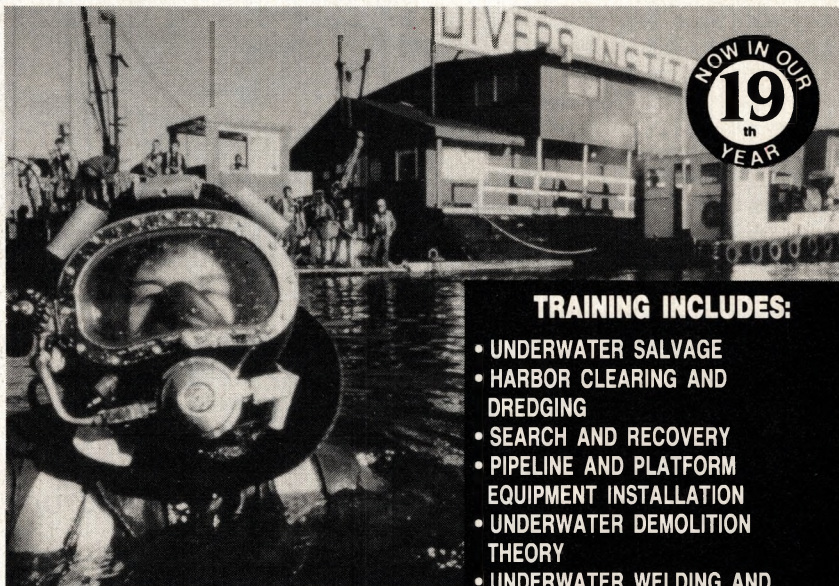
Randy Kimery, Baltimore, Maryland is interested in the wreck of the steamer *New Jersey*, sunk in the Chesapeake Bay. The *New Jersey* was the Old Bay Line's first steamboat to use a propeller instead of paddlewheels. She made her last voyage in February 1870—from Baltimore to Norfolk—carrying a load of flour, corn, bacon and petroleum. The crew's efforts to extinguish a fire that spread rapidly across wooden decks and rigging were fruitless. Captain A.K. Calle and his crew abandoned ship and were later rescued by the steamship, *Pacific*. The *New Jersey* sank in a channel 55 feet deep in the middle of the Chesapeake Bay. Divers discovered the wreck in 1975 and named it the "Pitcher Wreck" after recovering a load of molasses pitchers from the hold.

Thomas Howd, Stony Creek, Connecticut, is no slouch in recovering artifacts. While diving around the Thimble Islands in Stony Creek, he recovered rings (one dated 1855), silverware, bottles and snuff boxes. He donated two of his finds—wooden balls used in lawn bowling—to the Bowler's Hall of Fame Museum in Wisconsin. Officials from the museum say these are the oldest in their collection, circa 1870.

Phil Hoffman's book, the comprehensive *Guide to Scuba Diving in Hawaii* is not a wreck diving publication, but does mention WW II vintage aircraft, a 19th century steamship and remains of old fishing vessels. The 111 page paperback covers the four main diving islands: Oahu, Kauai, Maui and Hawaii, including marine life, weather and dive operations.

(Continued on Page 38)

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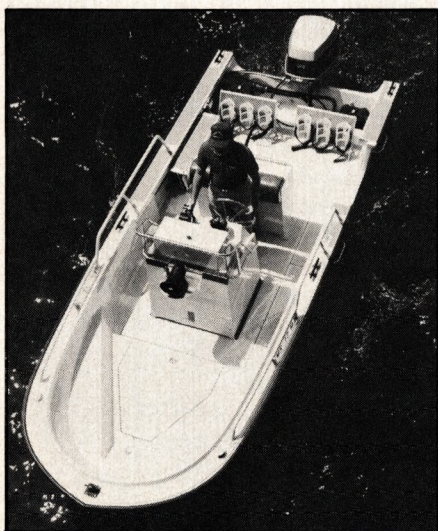
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It must look a little strange from the perspective of other boaters—it certainly did from mine. I guess that's what prompted the fellow on the sailboat to flag us down and ask, "Just what is that boat built for?" "Diving," came the response from Larry Taylor of the commercial products division of Boston Whaler. "What a neat idea," the sailor's female companion called back. What a neat idea, indeed.

For me, it was almost a surprise—a pleasant one at that—to hear a representative from one of America's premier boat manufacturers say straight out that one of their boats was purposely designed for divers. In five years of reporting about boats to SKIN DIVER readers we have come across only one other that was expressly designed for that purpose.



And, that was built by a much smaller company than Boston Whaler.

According to Taylor, his company is very interested in the sport and has been following its growth for several years. He is also a bit surprised other major companies have not discovered what he has: There is a very large number of people out there who dive regularly and want to

BOSTON WHALER'S Guardian 18

TEXT AND PHOTOGRAPHY BY STEVE LUCAS

own only the very best equipment available, from regulators to means of transportation to the dive site.

What catches everyone's attention is the 34 inch wide "hole" in the port side of the 18 foot Guardian. Actually, it is not a hole at all but a "cutout," as the company prefers to call it. Its purpose is immediately obvious to the initiated: When a door is lifted out, water entries and exits are simple. We were raising eyebrows by running with the door removed. And, not in flat seas, either! At times Taylor would send the boat directly through the two foot slop created by other boats on Fort Lauderdale's intercoastal waterway. He made every effort to deliberately swamp us, including tight turns to port that should have made the hole act like a giant water scoop. The best he could do was a one inch deep puddle less than 18

inches wide, which was confined to one small corner of the boat's port side.

Why won't the Guardian fill with water? Boston Whaler has built scuppers (drain holes) all along the transom to immediately send any collected water back to the sea. But, even if you did manage to fill the boat to the gunwales, you couldn't sink it because of the unique way Whaler builds its boats. While still wet in the mold the area between the hull and deck inner liner is pressure injected with foam. When it sets it causes all the parts to bond together permanently.

The Guardian has two and one-half times the flotation required by the U.S. Coast Guard. As Taylor says, "The Guardian is like a surfboard with sides. You can't get water inside it, so you can't sink it." In fact, Boston Whaler is the only company that we know of that actually advertises a "swamped capacity." In the case of the Guardian 18, it would take an additional 3,000 pounds of weight to lower a fully swamped boat far enough to get the engine wet!

As a deep-V, the boat only draws nine inches of water. Its rated passenger capacity is seven, but with diving gear four would be a full boat. Its overall length is 18' 6" and the beam is 7' 2". The weight is 1,750 pounds and maximum power for its outboard is 150 hp. The built-in fuel tank has a capacity of 63 gallons. The ride is typical of a deep-V and is as comfortable as can be expected in rough conditions. The hull slices the water nicely and its chine configuration keeps the spray low and the passengers fairly dry.

(Continued on Page 40)

The 18 foot Guardian from Boston Whaler features a 34 inch wide "cutout" in the port side that serves as a built-in dive platform. Rescue rails, placed just above the waterline on both sides, are optional. The Guardian offers plenty of open deck.



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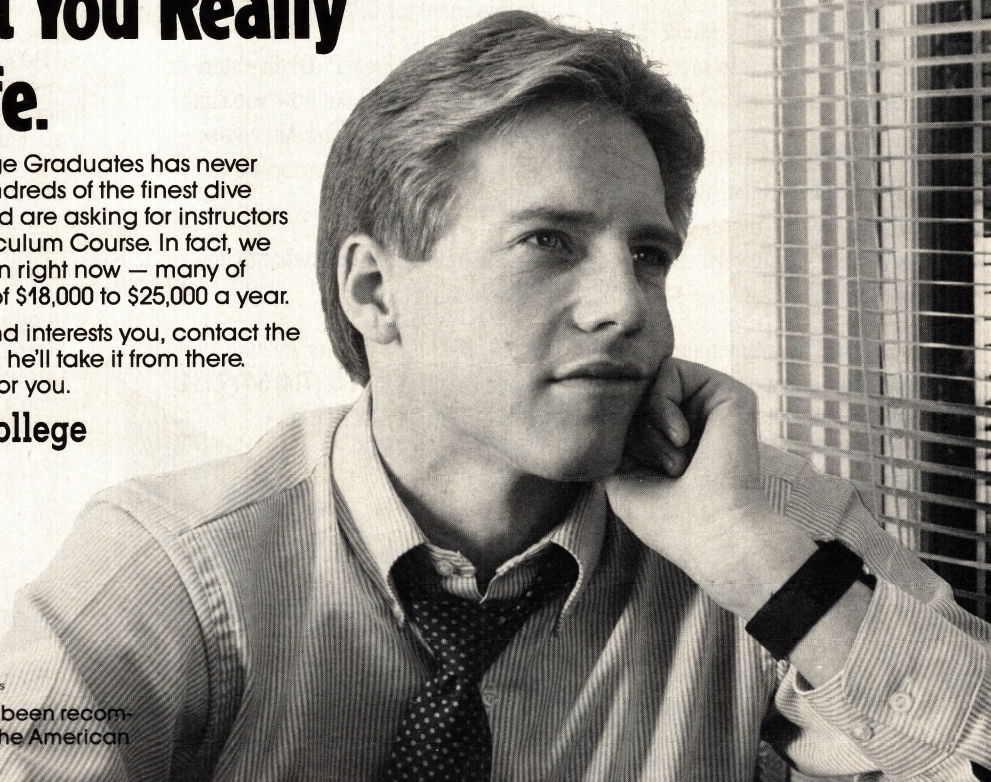
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tively using the most up-to-date methods. And, remember that Medic First Aid meets the PADI Rescue Diver requirement for CPR.

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Medic First Aid, as approved by the U.S. Department of Labor, Mine Safety and Health Administration, covers primary care, secondary surveys, and lastly treatments, according to the *Journal of the American Medical Association*, Standards and Guidelines for Basic Life Support (CPR) (June 6, 1986) and the American Academy of Orthopaedic Surgeons.

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WRECK FACTS

(Continued from Page 35)

The author takes the reader on a circular trip of each island, describing his favorite dive sites along the way. The book is available from Pacific Trade Group, P.O. Box 668, Pearl City, HI 96782. The price is \$7.95, including postage.

I'm amazed at the wealth of information that comes out in a quarterly publication called *Plus Ultra*. (*Plus Ultra* is a Spanish motto, derived from Latin, meaning "more world beyond.") Divers Ernie Richards and Bob Weller, Palm Beach County, Florida, write about Spanish colonial coinage. They also list forthcoming coin and artifact shows and feature various coin wrecks. For details, write to Ernie Richards, P.O. Box 1697, West Palm Beach, FL 33402.

Marty Meylach, author of the classic book, *Diving to a Flash of Gold*, is in the market for coins, bronze spikes, clay pipes, olive jars and the "1001 old shipwreck items that divers accumulate." He displays these in shows throughout Florida and the U.S. If you have anything for sale, contact Captain Marty Meylach, P.O. Box 163939, Miami, FL 33116.

Researchers of the Sunshine State might be interested in *Florida Archaeology*, a two volume series published by the Florida Bureau of Archaeological Research. Volume I is a bibliography of books, articles and presentations on Florida archaeology from 1867 through 1980. Volume II presents translations of documents that are important sources for Spanish Florida in the 17th century. Jim Miller, chief of the Bureau of Archaeological Research, says that people interested in diving and maritime history will find the Ecija voyages of 1605 and 1609 worth their time. Spanish explorer Francisco Fernandez de Ecija explored the coast north of St. Augustine, recording details of his encounters along the way. Both volumes are available from Florida Classics Library, P.O. Box 1657, Port Salerno, FL 33492. The price of each is \$10.95, including postage.

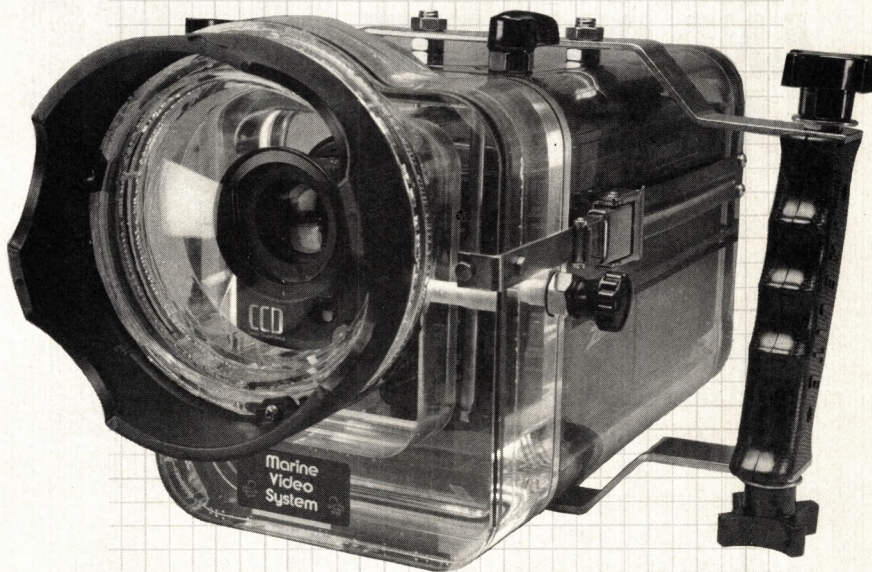
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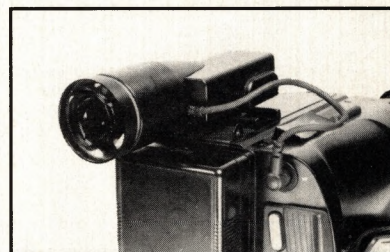
Flat Port	#6030
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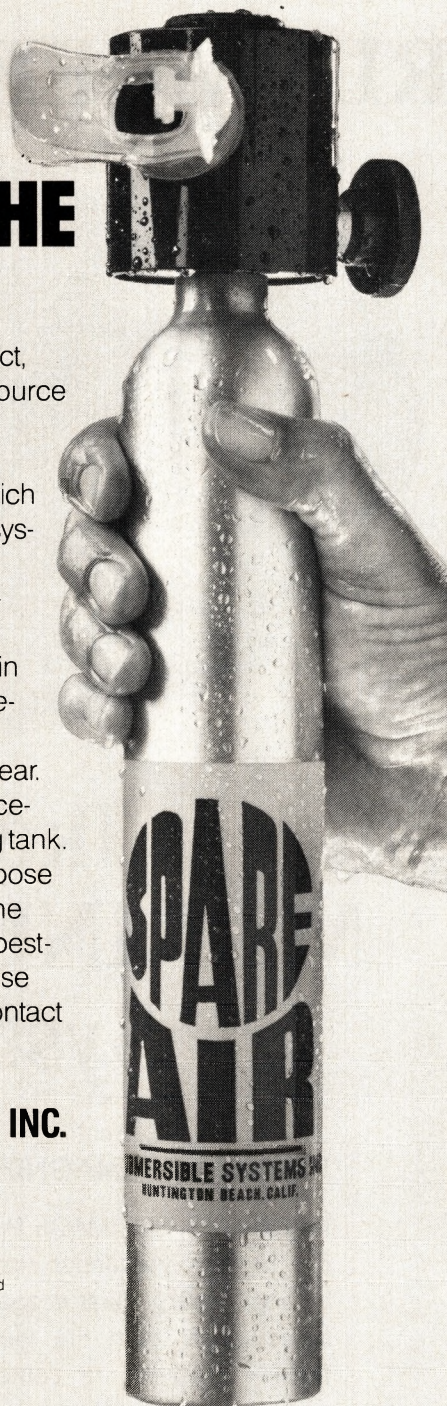
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GUARDIAN 18

(Continued from Page 36)

Built by the company's commercial division, the Guardian is an even tougher version of the Whaler's standard (already tough) boats. It is designed for everyday use by the military, police and marine rescue agencies, which do not have the time to give the boat the maintenance a proud owner would be more inclined to give. These boats are so tough they are frequently towed behind U.S. Navy destroyers utilizing a heavy duty stainless steel bow eye reinforcement (optional). If the boat can stand up to the stress of being hauled behind a fighting ship, you are simply not going to hurt it by dragging it behind a sail or power boat.

You can also continuously beach the boat, without fear of damaging the keel, by adding the optional heavy duty stainless steel cutwater plate. Just above the keel's waterline, it runs a full six feet beneath the boat and six inches either side of the keel to offer permanent protection from sand abrasion.

As a commercial boat you will have no worries of anything rusting. The rails, which are available in several configurations including the hi-low design on our test model, are built of 5086 marine aluminum, which is actually more rugged than stainless steel. Accessories divers will want to consider adding are "rescue rails," placed just above the waterline on the outside of the hull. Divers waiting at the surface, either before or after a dive, will find these valuable.

Other options divers will want to consider adding are the tank racks, which mount just in front of the outboard or along the gunwales. A ladder that drops three feet into the water is also available.

If an 18 footer is more or less boat than wanted, but the idea of an absolutely unsinkable design and the door cutout are right for you, then you may want to consider the same center console Guardian design in either the 17, 20, 22 or 25 foot configurations. The base price of the 18 foot model with the cutout door is \$16,940. For the hi-low rails add \$695 and \$495 for the rescue rails. The dive ladder is \$1,350 and a tank rack assembly for three tanks is \$450.

Boston Whalers are available worldwide. For the name of a dealer near you or a commercial products catalogue featuring the Guardian series write Boston Whaler, Inc., Commercial Products Division, 1149 Hingham St., Rockland, MA 02370-0611. >B&B

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NAUI APPOINTMENTS

The dramatic increase in NAUI courses and activities in foreign countries has resulted in the appointment of new liaisons. Dorthe Reshef is now NAUI's representative in Europe. Larry Parker is the Central America liaison.

Reshef and Parker will supervise leadership training, quality control, services, materials translation, facility programs and government matters pertaining to recreational diving. They will handle public relations, instructor award recommendations and promotion of the International Conferences on U/W Education.

Jim Brown and Gary Caldwell have been appointed to positions on the NAUI Headquarters management team. Brown is training manager and Caldwell is the new service support manager.

Brown supervises, manages, develops and oversees the many aspects of NAUI leadership-level courses, including programs, materials, education, standards and ethics.

Caldwell supervises the office staff, coordinates order and certification card processing, insurance renewals and the mailing/shipping department.

CARTER/SHERWOOD

John Carter has been appointed Sherwood sales representative for Kentucky, Tennessee, Virginia, West Virginia, North Carolina and South Carolina. Sherwood South is the distributor serving this sales area. Dive stores here receive Sherwood products directly from the company's warehouse near Atlanta, Georgia.

Carter can be contacted through Sherwood South at 6161 Atlantic Boulevard, Norcross, GA 30071, or at his North Carolina office at 1835 Spring Garden Street, Greensboro, NC 27403.

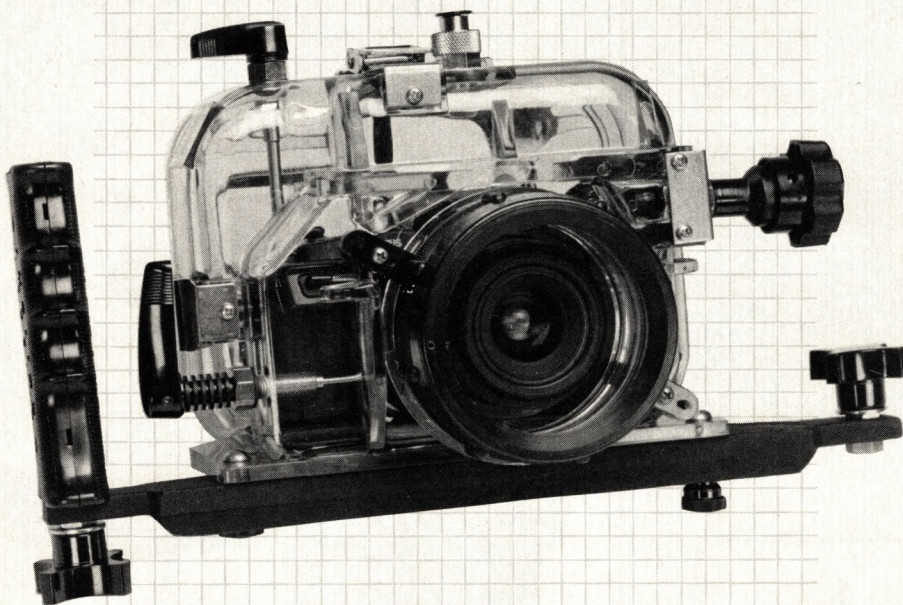
PALMETTO FIRST AID COURSE

Palmetto Scuba, Inc. of Port Paradise Resort in Crystal River, Florida and Hilton Head Island, South Carolina has recently added medic first aid to its schedule of continuing education courses. Rob Javins, facility training director, recently completed the PADI medic first aid instructor training course and will offer the course on a monthly basis.

In as little as eight hours, participants can learn how to save someone's life with basic first aid and CPR. And, medic first aid meets the PADI rescue diver requirements for CPR.

For information and class dates contact Rob Javins at Palmetto Scuba, P.O. Box 2532, Crystal River, FL 32629; (904) 795-7437 or (803) 681-DIVE.

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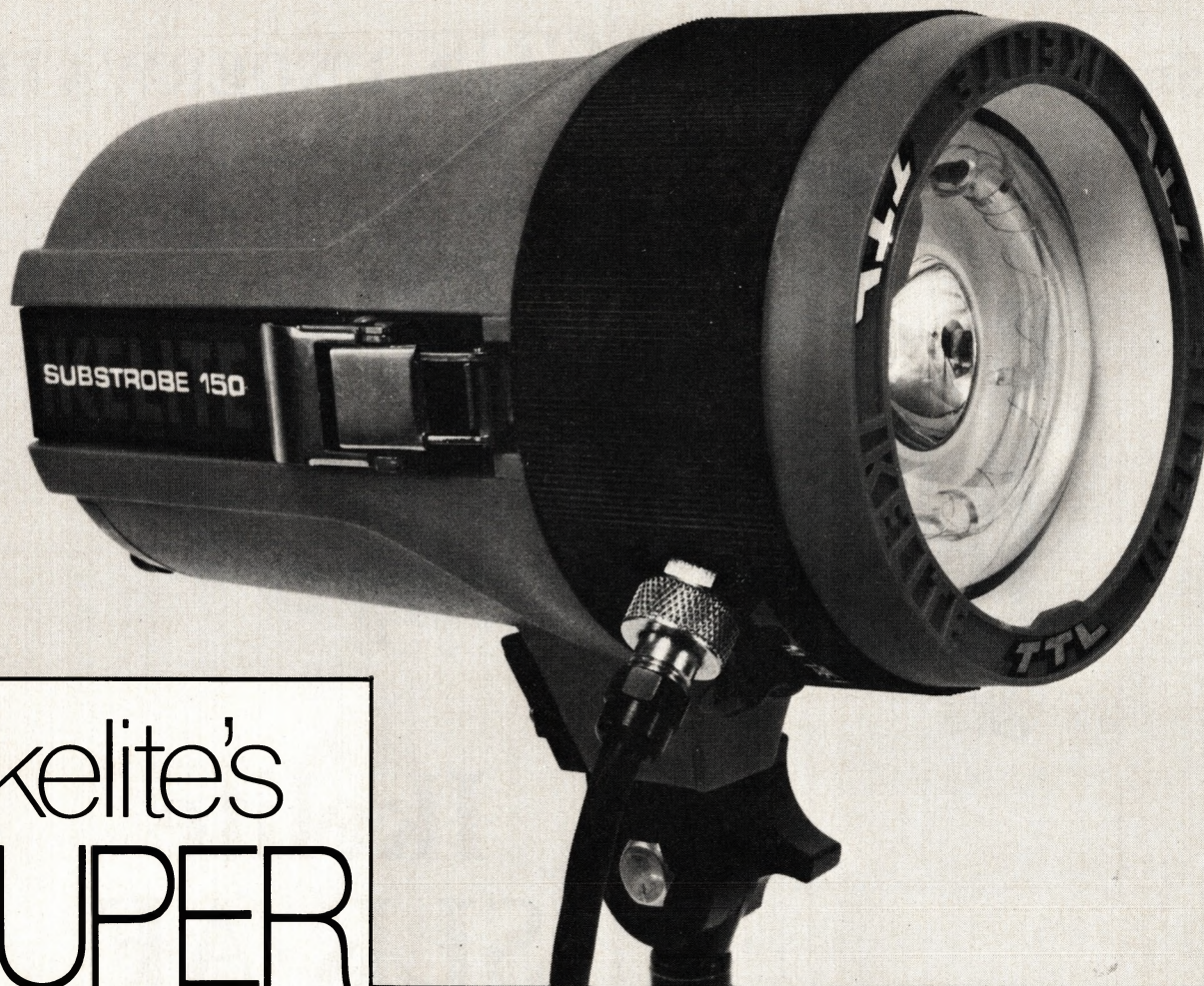
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Ikelite's SUPER COLOR 150 A NEW SUBSTROBE 500 DEGREES WARMER

TEXT AND PHOTOGRAPHY
BY GERI MURPHY

Someone once said, "You can't teach an old dog new tricks." Well, Ikelite has just proved this legendary prophecy wrong. The company has taught its prized pedigree underwater strobe a new trick and earned a standing ovation from professional underwater photographers across the U.S. because of it.

The Substrobe 150 was first introduced to the diving world in 1980. It has proven to be one of the most popular wide angle U/W strobes of the '80s. It is a durable, dependable workhorse for thousands of photographers.

Now, after three years of development and testing, Ikelite has made a good strobe better with a new/improved flash reflector. The new Substrobe 150 delivers a softer, warmer light that produces realistic skin tones and rich colors.

Ikelite began its quest for truer color in 1984, when customers expressed a need for a warmer flash at longer shooting distances. The Substrobe 150 was putting out tons of light at 5,300°Kelvin. And, while this color temperature was perfectly matched for daylight film above water, it fell short of the color mark when used for long shots underwater.

The selective color filtration of water was knocking out most reds at distances

of five to seven feet. This is because light from the strobe actually travels 10 to 14 feet, going from the strobe to the subject and then back to the camera lens.

The only way to offset such filtration is to produce a warmer flash. The question was, how do you warm up the color output without decreasing flash output? Ikelite's engineers tested a variety of approaches including different flash tubes, electronics and reflectors.

The end result is a flash reflector coating developed by a high temperature paint process. The older version of the Substrobe 150 had a highly polished aluminum parabolic reflector. In the new version, this same four-inch reflector has a highly reflective cream colored coating. This is also applied on the inside edge of the front dome port ring, thus extending the reflective area of the flash and improving the light output.

The new Substrobe 150 delivers warm, soft lighting at a color temperature of 4,800°Kelvin. Using a Minolta Color Meter II, we compared the new strobe to the older models and found it to be 500 degrees warmer.

The color temperature remains consistent to within 50°Kelvin at all power modes: full power, one-half power and



In addition to TTL automatic exposure, the Substrobe 150 has a built-in f/stop or flash exposure calculator on the back. It also offers three power settings, slave mode and a built-in aiming light. The flash cord is detachable and cords are available with a variety of different TTL and non-TTL connectors.



one-quarter power. Best of all, the new coated reflector has not diminished the Substrobe's output. The difference between the older polished reflector and the new coated version is less than one-fifth of an f/stop—hardly measurable with most flash meters.

Extensive testing has been done by a number of professional underwater photographers such as Rick Frehsee, Howard Hall and Fred Bavendam. All have reported favorable results.

How does the new Substrobe 150 perform U/W? The coated reflector produces better skin tones on divers at distances of three to seven feet. Since most people photography is done with wide angle lenses at an average distance of five feet, the new Substrobe 150 is ideally color balanced for this range. It produces a warm, natural color, much like bright sunlight at shallow depths. Closer—1.5 to 2.5 feet—there is just a slight overwarm coloration, causing skin to look a deep tan. The effect is not objectionable.

I would not recommend the new 150 for macro or close-up work unless you hold the strobe at least two feet behind the camera. Any closer would result in a photo that is overwarm.

Overall, the new reflector is far superior

to the older version. Red and yellow subjects seem to pop out from blue water backgrounds, instead of appearing muted. Skin tones are truer. The overall lighting seems more natural, more pleasant.

For those who have never had an opportunity to use a Substrobe 150, we should list the myriad of features that have made this strobe such a winner.

It is one of the few wide angle strobes that will operate on either a rechargeable power pack or a set of six alkaline D-cells. The rechargeable nickel-cadmium module is removable, so you can rotate

battery packs and continue using your strobe while charging the exhausted pack. A fully charged battery pack will deliver 150 flashes on manual full power or up to 600 flashes on one-quarter power. The power pack can be charged in four hours with Ikelite's Quick Charger.

The Substrobe 150 is regarded as one of the "big gun" class of underwater strobes. The field of coverage is 110 degrees, more than enough for the Nikonos 15mm extreme wide angle lens (94 degrees). The guide number for ASA/ISO 100 film is 120 in air and 34 underwater. U/W, at a distance of five feet, this strobe will allow an exposure of f/5.6 or better.

The strobe offers three different options for exposure control: 1) manual exposure; 2) TTL exposure; or 3) auto exposure (non-TTL). The TTL mode will work in conjunction with the Nikonos V or a TTL 35mm SLR camera in an Ikelite housing. The strobe can also operate in slave mode, being remotely triggered by another strobe. The Substrobe 150 offers three different power settings, quick recycle times and a built-in aiming light for accurate lighting coverage and night photography. The flash cord is detachable for travel, quick replacement or switching

(Continued on Page 50)

COLOR TEMPERATURE COMPARISONS

Color Temperature	Light Source
10,000°K	Clear blue sky
8,000°K	Overcast sky
6,000°K	Sunny/clear sky
5,400°K	Noon/sunlight
5,000°K	Early afternoon
4,000°K	Fluorescent (warm)
4,200°K	Late afternoon
3,400°K	Incandescent

SDM SPECIAL SERIES ON REGULATORS

TR-200



TEXT AND PHOTOGRAPHY BY ERIC HANAUER

Tabata has introduced a new line of regulators. Thus, the TR-200 TUSA Liberator—an update of the TR-100—has a pretty new face, available in six different colors. Inside, evolutionary changes have improved the reliability of an already good product.

TUSA stands for Tabata USA, which is more than just a sales arm of the parent Japanese company. Doing its part to improve the balance of trade, several of Tabata's products are designed and made in the USA. This has been the case with its regulators for several years. The original Tabata regulator, designed for the home market, couldn't compete with those available here. So, when Tabata became serious about entering the American market, it bought an existing regulator that had earned a solid reputation here over a ten year period. It was updated and offered as the TR-30. Improvements in first stage porting, addition of silicone parts and a cosmetic facelift upgraded it to the TR-100 (SDM, October 1985). Further improvements in cosmetics and a bit more debugging have result-

ed in this new offering, the TR-200.

The first thing you notice about Tabata regulators is their colorful faces. High fashion and color coordination is a guiding philosophy of Tabata USA's marketing strategy. All their products, including fins, knives, snorkels, boots and consoles, as well as the more obvious masks and BCs, are available in five to seven colors. This allows the diver to mix or match for an attractive, coordinated look. The success of that strategy can be measured by the number of competitors who have jumped on the color bandwagon.

The TR-200's cover is charcoal gray with a high-tech, asymmetrical look. The case and purge button are offered in a choice of six colors to complement your other equipment: dark blue, aqua blue, rose, pink, yellow and even black. In the octopus version, fluorescent orange replaces black as a color choice.

But, behind the pretty face are some significant improvements. The second stage demand valve body is now a snap-in fitting instead of the sonic weld used previously. This relieves stress and

makes the case more resistant to cracking at the point where the hose attaches, an Achilles' heel of many plastic cases. The O-ring is now mounted outboard, in the hose assembly, to further reduce stress. In the first stage, the Teflon high-pressure seat has been replaced by one made of polypropylene. This material is harder and less prone to distortion. With a harder material, the piston won't seat properly if it isn't accurately machined. Tabata's stainless steel piston is carefully machined to a smooth finish to prevent this problem.

Manufacturing Tabata's regulators is the responsibility of Fred Schuler, president of Advanced Diving Products in Costa Mesa, California. Schuler is an engineer with many years of experience in the diving industry. While with Voit in the 1960s he designed the original MR12, a well respected regulator that is still being produced in an updated form. The changes mentioned above, which have improved the reliability of Tabata's regulators, are the result of Schuler's work with the company over the past two years.

The TR-200 follows the accepted pattern of current regulator design: a balanced, flow-through piston first stage with a downstream, lever action second stage. Tabata has taken advantage of modern materials and technology to deliver very good performance in a conventional design.

The first stage is a compact, chromed brass housing with a swivel cap that has four low pressure ports. Two high pressure ports are in the main body. These allow the regulator to be mounted on the tank either vertically or horizontally and permit the submersible pressure gauge to be mounted on the right or left side. The swivel feels very tight until the regulator is attached to a tank and pressurized. Then the piston floats and the fitting loosens to allow cap and hoses to turn more easily. Internally, airflow passages are short and direct, resulting in more immediate response, especially when tank pressure is low. Environmental protection is built into the first stage by means of seven, small orifice, ambient ports. Silicone grease injected into them protects the spring and diaphragm from direct contact with contaminants.

Beyond its good looks, the second stage has several practical advantages. Extensive use of plastics and silicone combine to make it extremely lightweight and corrosion resistant. Breathing response is improved by minimizing friction and weight has been reduced by greater use of plastics. The demand valve sleeve is made of Delrin, a low friction, high density plastic that provides a self-lubricating shaft area for the poppet. This helps eliminate the possibility of freeze-up caused by buildup of salt and mineral deposits. Another friction reducing device is a nylon

button attached to the downstream lever, which rests against the stainless steel disc mounted on the silicone diaphragm. The mouthpiece, exhaust valve and exhaust tee are also made of translucent white silicone. A new, stiffer exhaust valve results in drier breathing.

The new cover has a sliding tab that keeps the purge button depressed when the regulator is being stored. This relieves spring pressure on the poppet and prevents it from being scored by the valve seat. If you forget to retract the tab, freeflow from the second stage when the air is turned on will remind you. Be sure to keep it retracted when washing the regulator, otherwise water can enter the hose and move up into the first stage.

An anodized aluminum retaining ring holds the cover in place. Nothing inside is user serviceable, but in an emergency it might become necessary to remove the cover. Since the ring is mounted on the case itself, it unscrews clockwise. That is the opposite way it would appear to go. When the ring is unscrewed, the cover and the diaphragm can be removed for emergency service. Upon replacing it, be sure the cover fits into the two indexing notches on the top and bottom, otherwise the ring will not screw down properly.

For divers who prefer the traditional chrome look, Tabata continues to offer the TR-100 regulator. All internal improvements of the new model have been made on it as well. The only difference is the TR-100's familiar face with a chromed brass cover and retaining ring. Its price is \$10 less than the new model.

In our performance test, the TR-200 proved an excellent example of a conventional regulator. It breathed smoothly and easily, as evidenced by a natural feel when slowly sipping air. Hard breathing at 60 feet still resulted in easy airflow, even at low tank pressures. The TR-200

breathes a little moist, but not objectionably so.

There was no excessive flow or leakage in the head down position. Breathing became harder when I was vertical, looking up, and when I was on my back. Only a slight puff of air was necessary for clearing. Pressing the purge button supplied a medium blast, more than enough to do the job. Freeflow occurred when the regulator was removed from the mouth with the mouthpiece up. It stopped when turned down, but began again when the mouthpiece was again turned up. After this happened several times, I noticed a bubble trapped behind the silicone diaphragm, which probably started the flow by a venturi effect. This did not occur while I was swimming on the surface and can be dismissed as an interesting idiosyncrasy. It is unlikely that a diver would intentionally turn the mouthpiece up after stopping a freeflow.

A similar effect was noted when I loosened my lips around the mouthpiece. Air began flowing and didn't stop until I tightened the seal. Apparently this regulator needs some backpressure when the mouthpiece is facing up. No doubt this characteristic is a result of its easy airflow rate, which is exceptionally good.

Although the basic hardware has been around for awhile, the TR-200's design has been fine tuned with up to date materials. Its looks are as contemporary as any in the field. With its wide color choice, it is likely to become a favorite of underwater photographers and models. Backed with a lifetime warranty, the TR-200 has a suggested retail price of \$250; an octopus second stage with a 33 inch hose is available for an additional \$110. For further information, see your Tabata dealer or contact the manufacturer, Tabata USA, Inc., 2380 Mira Mar Avenue, Long Beach, California 90815. 

TR-200

First stage:

Type.....Balanced piston
Working pressure.....4,000 psi
Material.....Forged brass, chrome plated
Polypropylene high pressure seat
Stainless steel piston
High pressure ports.....Two, 1/8" thread,
on swivel cap
Low pressure ports.....Four, 1/4" thread
Environmental protection.....Standard
Intermediate pressure.....135 psi
Length of hose.....27' (33' for octopus)
Swivel connection.....On first and
second stage

Second stage:

Type.....Downstream, lever action
Material.....High impact ABS case
Silicone diaphragm, mouthpiece,
exhaust tee
Exhalation port.....One, with silicone
valve
List price.....Regulator \$250
Octopus second stage \$110

The TR-200's second stage (right) has a charcoal gray cover with an asymmetric look. The case and purge button are available in six colors. The first stage (left) has two high and four low pressure ports.





SDM'S U/W Video Course

Tips For Beginners

TEXT AND PHOTOGRAPHY BY JIM AND CATHY CHURCH

The purpose of this lesson is to give you six tips for creating interest in your U/W videos. These tips will answer the viewer's basic questions, show events in logical sequences that tell a story, commit to the most interesting action, emphasize subject movement and get viewers ready for unexpected action.

ANSWER THE QUESTIONS

Use the six basic questions you learned in your English or journalism class—who, what, when, where, why and how—to help develop a story line:

In addition to showing unusual action (a diver handling a scorpionfish), the scene shown in this photo answers four basic questions: Who? The diver, Cathy Church, is identifiable. What? She is videotaping the fish. How? She is holding the camera in one hand and the fish in the other. Why? Because she is having fun (note her smiling eyes).

1. *Who is involved?* Long shots of divers swimming about will lack interest if you don't identify the divers to your viewers. Move in for a topside MS or underwater CU to show the divers' faces. Once you have identified your models, and the viewer can differentiate between them by equipment or colors, the question of who is resolved as the divers swim in and out of your U/W scenes.

2. *What is happening?* Identify the action by showing what the divers are doing. If, for example, you show someone peering into a crevice or beneath a ledge,

move in and show what he/she is looking at. Otherwise, the impact of the next scene is lost because viewers are still wondering what they missed.

3. *When did it happen?* If your video movie features an annual dive trip or other special occasion, let the viewer know when with either narration or a title. You don't need a fancy title, just show someone writing the date in the sand with a finger or a stick.

4. *Where did it happen?* If you are visiting a dive resort, begin with a scene showing a sign naming the resort. If you are on a live-aboard boat, show an LS of the boat followed by a CU of its name. Use your imagination—show an overall scene that identifies the location.

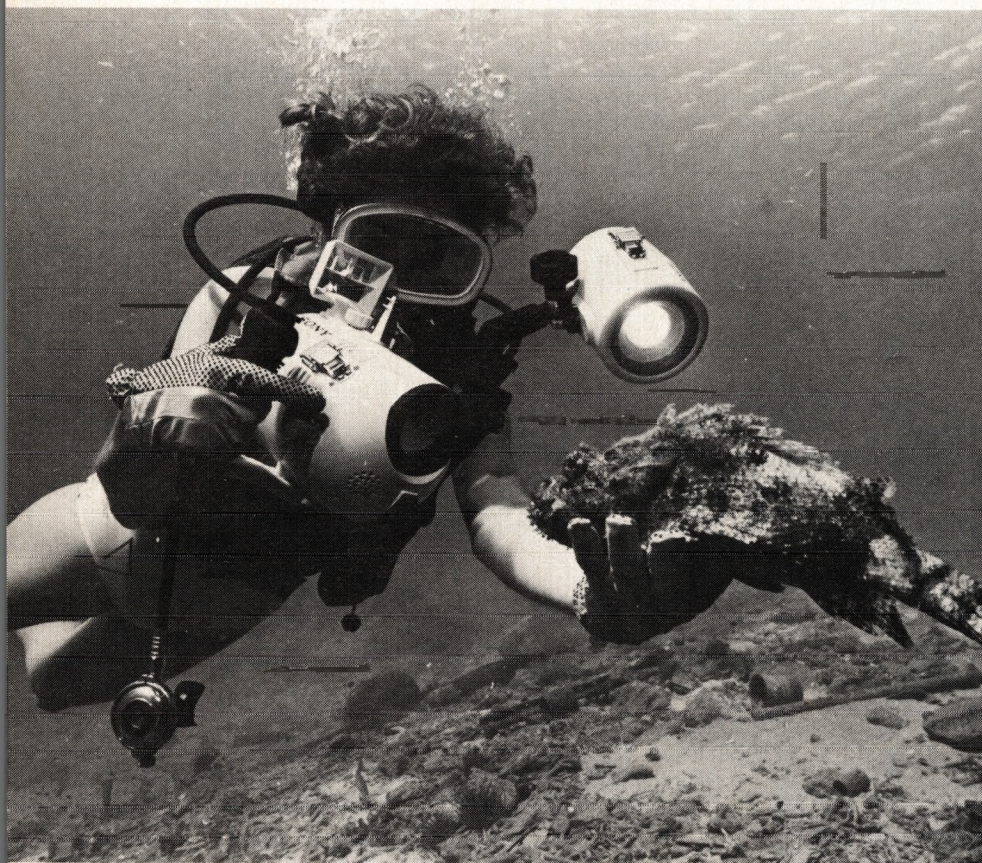
5. *Why did it happen?* If your video shows an annual dive trip, the why will be obvious. But, if your models are feeding fish or exploring a wreck, the why will be implied. The why will be most important if your video documents a special event.

6. *How did it happen?* If you show strong action, you may need to show how it was completed. If, for example, you show an LS of a diver pursued and surrounded by fish, move in for a CU showing the food used to attract the fish. If you show an U/W photographer at work, use cut-in CU shots of the diver's hands making camera adjustments. Or, if you show divers raising an old anchor or other artifact, use CU shots that show how the lift-bags are attached and filled.

CREATE SEQUENCES

Using a story line requires that you show scenes in a logical sequence. For example, begin with a topside LS showing divers rolling off the rear platform of the boat, follow with an U/W overlap of the divers breaking through the surface, and then use a downward camera angle to show them descending the anchorline. On the bottom, use other sequences of shots to show what the divers are doing. If you shoot scenes in a random order, your video won't make sense!

If you have the time and equipment to edit videotape, you can electronically se-



YOUR ARSENAL OF VIDEO SHOTS

The basic video shots are the long distance (LS), medium distance (MS) and close-up (CU). The picture areas of these shots vary with subject size. The LS, MS, CU and LS sequence is a basic pattern. The LS introduces the viewer to the overall scene, the MS identifies the action and the CU pinpoints the action. The LS ends the sequence.

Cut-in and cut-away shots can be added to the basic LS, MS, CU and LS pattern. A cut-in shot is usually a brief CU that cuts directly into the main action, for example, a shot showing an underwater photographer's hands setting camera controls. A cut-away shot cuts to a related action, such as the face of a diver watching the main action. Cut-in and cut-away shots break the potential boredom of long scenes.

Shooting overlapped action is easy and gives your videos a professional touch. An overlap consists of two shots: The first shot ends during the middle of an action (such as a diver swimming through a hatchway). The second shot picks up the action from a different angle (such as the view from the other side of the hatch as the diver swims through). Thus, the viewer sees a continuous action from two viewpoints. When you shoot an overlap, however, your model must do the same action twice.

lect whatever footage you wish and rearrange scenes into logical sequences. If you don't have editing equipment, you must edit in camera. This means shooting each scene in sequence and it isn't always easy.

Scene lengths vary with interest and action. About ten seconds is long enough for most scenes, but for a cut-in or cut-away, five seconds is usually enough. Even if the action is strong, more than about 15 seconds becomes boring. If you wish to continue showing the same action, shut the camera off, change the angle or distance and then shoot more. Cut-ins and cut-aways are great for "punctuating" long action sequences.

COMMIT TO A SUBJECT

Once you identify your main subject, don't pan to secondary subjects (other than for a short cut-away). Jim learned this while videotaping a sunken ship at Truk Lagoon. He was swimming low and slowly along the deck of *Sankisan* when an open hatchway appeared in the distance. He centered the hatchway in the viewfinder and moved in closer. As he moved in, the implied action was the view through the hatch the viewer would soon see; then suddenly, in the left of the viewfinder, Jim saw movement. He panned his video camera to the left—to a nondescript swimming diver—then panned back to the hatchway. When we viewed the video tape later, Jim's indecision was obvious to every viewer—it broke the sense of expectation, of what was on the other side of the hatchway. We learned a valuable lesson: Once you commit yourself to a subject (the open hatchway in our example), stick with it or end the scene. Once your camera wavers from your main subject to a lesser subject and then back again, you've lost continuity.

Ignoring a strong subject is another version of lack of commitment. Imagine, for example, that you are viewing a video and the close-up image of an eel appears on the screen. The eel grabs your attention, but the camera pans away from the eel to some drab reef. You know the eel is just out of your view. Your feeling is probably disappointment because the videographer didn't commit to the eel.

EMPHASIZE SUBJECT MOVEMENT

Hold the camera as steady as possible and let your subjects do the moving. Allow divers or fish to swim into the picture area and then swim out again. If the subject is stationary, camera movement will disturb the viewer. Minimize panning

In this similar photo the same questions are answered. In this case, however, the question how might be answered "very carefully." Note that she wears no gloves and seems to be in a more serious mood.



PRE-DIVE VIDEO CHECKLIST

Make a pre-dive checklist you will follow each time you use your video camera. Use a label maker or other device to attach the checklist to the camera housing. Modify this list to meet your specific needs:

1. Charge and install batteries.
2. Turn autofocus off (for dome port).
3. Adjust focus.
4. Set filter switch for daylight.
5. Set sensitivity switch for normal in bright water.
6. Set tape switch for fast plan.
7. Some cameras overexpose slightly underwater. Thus, if your camera has a manual control to increase or reduce the automatic exposure, you may wish to reduce exposure slightly.
8. Place videotape in camera or recorder.
9. Place camera in housing.
10. Clean and lubricate O-rings (as per housing manufacturer's instructions).
11. In humid climates, if the recorder has a dew switch that's been turning the recorder off, blow the housing out with warm (not hot) air from a hair dryer.
12. Close housing latches.
13. Press on/off button to verify the camera (and light) operates.
14. Submerge camera housing in freshwater rinse tank and check for leaks.

and do it slowly when it is necessary. Following subjects with the camera only makes viewers seasick. And, for topside shots, use a tripod whenever possible. Have your subjects walk into and out of frame to begin and end a scene. Remember: Jerky, unnecessary camera movement makes videos unpleasant to view.

BE READY FOR ACTION

You often see the most interesting subjects—a whale or a ray gliding by, or a turtle heading for parts unknown—when you first enter the water. Thus, if you have editing equipment and there is a chance for an immediate encounter with an interesting creature, turn your video camera on just before starting your dive. Thus, if you do see something, your tape is rolling. You can record the action and edit it into your story later. And, if you don't see anything, you can always use the tape again later.

CONCLUSIONS

You can't always plan your movies and sequences ahead of time because action is often spontaneous and unpredictable. But, keeping the six basic questions in mind, thinking of sequences, committing yourself to the strongest action, working with subject movement rather than camera movement, and shooting early are all important tips that will make your videos more interesting. 



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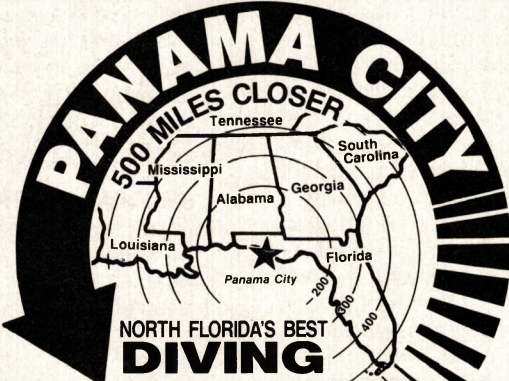
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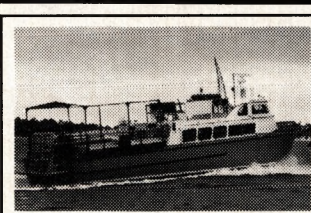
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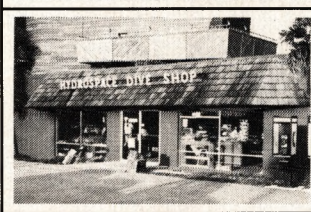
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SUBSTROBE

(Continued from Page 45)

connectors. Substrobe flash cords are available with a variety of different connectors including: Nikonos V TTL, Nikonos non-TTL, E/O, Nelson, Ikelite TTL, Ikelite non-TTL, dual flash and with a

SUBSTROBE 150

Power output	Full—150 watt/seconds ½—75 watt/seconds ¼—40 watt/seconds
Power source	Removable power module of six rechargeable nickel-cadmium batteries
Power modes	Full, ½ and ¼
Number of flashes	Full power—150 ½ power—300 ¼ power—600
Recycle time	Full power—6 seconds ½ power—3 seconds ¼ power—2 seconds
Charging time	Quick charger—4 hours Modular charger—15 hours
Angle-of-coverage	110 degrees
Flash tube	Circular
Color temperature	4,800° Kelvin
Aiming light	Built-in, center of reflector
Flash exposure modes	1) Manual exposure 2) TTL automatic exposure 3) Automatic (non-TTL) 4) Slave exposure
Sync cord connectors	1) Nikonos V TTL 2) Nikonos IV, III, non-TTL 3) Ikelite TTL 4) Ikelite non-TTL 5) Nelson 6) E/O 7) PC (surface camera)
Depth tested	300 feet
Weight	Air—7 pounds U/W—4 ounces

COMPARISON OF COLOR TEMPERATURE WIDE ANGLE U/W STROBES

MODEL	TEMPERATURE
Ikelite Substrobe 150	4,800° Kelvin
Subsea 150 RG	5,500° Kelvin
Sea & Sea YS-150	5,400° Kelvin
Oceanic 3000	5,700° Kelvin
Subatec 100	4,500° Kelvin
Nikonos SB-102	5,350° Kelvin
SB-102 w/diffuser	4,800° Kelvin

Note: All color temperatures are manufacturer's ratings.

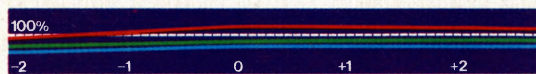
camera PC for surface use. The Substrobe 150 will connect to virtually every type of underwater housing or Nikonos connector on the market.

The Substrobe 150 retails for \$529.95. Flash cords vary in price from \$29.95 to \$119.95, depending on the type of connector. The popular Nikonos V TTL cord

(Continued on Page 54)

Above. Getting images that go beyond the ordinary requires special resources. Technique. Tenacity. Vision. But no matter how hard you work to control conditions, the beauty and mystery you see often seem to dissolve in your lens. It just may be that your film isn't up to the task. Now there's an alternative. Kodacolor VR-G 200 film.

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Horse Of Many

TEXT AND PHOTOGRAPHY BY GERI MURPHY

Down through the centuries the gentle seahorse has been a symbol of peace, love and good fortune. In fact, an old Caribbean salt once told me that he who sees a seahorse underwater will enjoy seven years of good luck. Whether myth or magic, the veracity of this superstition lies with the beholder.

Perhaps the greatest truth to this old legend is the level of difficulty a diver has in "seeing" a seahorse. These wonderful creatures are not rare, just rarely seen. Why? First of all, seahorses are shy, timid little creatures that prefer the quiet solitude of shallow eel grass or staghorn coral beds. These are places scuba divers seldom go. They are also found in the shallows of calm harbors and under piers.

The seahorse prefers these calm areas because of its limited swimming ability. It can barely attain the speed of one foot per minute (60 feet per hour).

Propulsion is achieved by the rapid hummingbird-like motion of its tiny dorsal fin and the two, fragile pectoral fins on the sides of its head. These vibrate 35 times per second, giving the seahorse the appearance of gliding through the water.

But the seahorse's fast fluttering fins are no match for strong currents or surge. This is why the seahorse is equipped with a prehensile tail. It is nature's answer to an anchor. The tail can be coiled around any slender object solidly planted in the seafloor. It can be a finger sponge, staghorn spike or blade of grass.

Since the seahorse cannot easily flee from its natural predators, it has an alternate form of defense. It can change the color of its skin at will, often mimicking the exact pattern of its background. The seahorse may be yellow if living on a yellow finger sponge or maroon if on a sponge of that color.

It takes a keen eye and patient searching to spot a seahorse, but it is worth the effort. And, who knows—it might bring you seven years of good luck! 



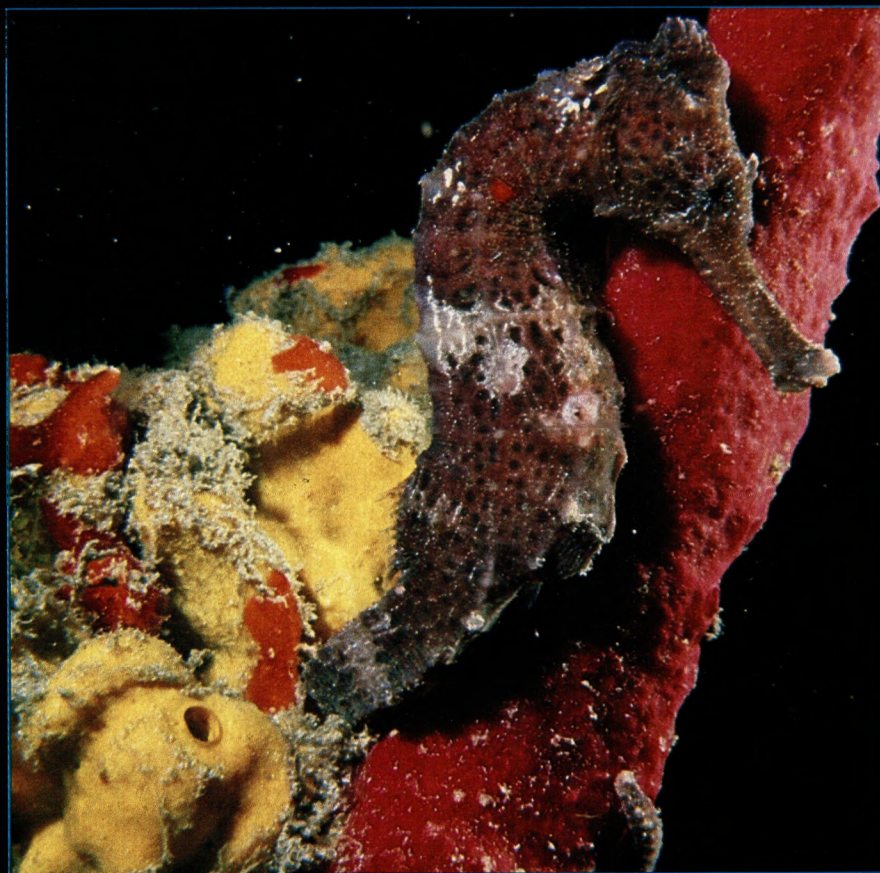
This 1:1 macro shot of a seahorse shows the delicate pectoral fin on its head.

Colors

A MARVELOUS MIMIC OF ITS SURROUNDINGS



In a 1:2 macro face-off, two seahorses display very different colors. Note that, regardless of color, each animal's texture and pattern is very similar to that of coral.



In this 1:3 macro photo, a brown seahorse has grasped a red finger sponge with its prehensile tail. Soon it will alter its color to match the surroundings—or move.



This yellow seahorse was photographed against a coral background to which it had matched its color.



Seahorses are poor swimmers and prefer calm areas with good cover.



Camouflaged and motionless, a seahorse hides from predators and prey.

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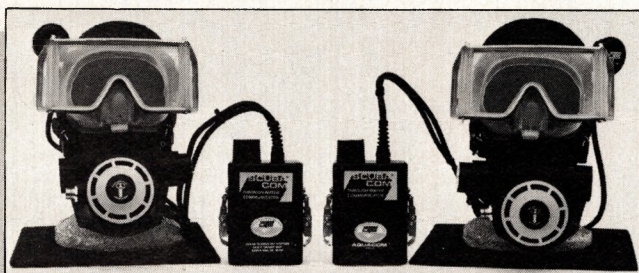
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SUBSTROBE

(Continued from Page 50)

sells for \$59.95. A trickle charger comes with the strobe, but the optional super-fast Quick Charger sells for \$39.95. Flash arms and camera trays are also extra and vary in price.

If this all sounds too confusing, Ikelite offers a complete Substrobe 150 TTL package for the Nikonos V. Priced at \$749.95, the package includes: strobe, flash cord, flash arm, camera tray, tray grip, rapid advance lever, Quick Charger and carrying case. It is quite a deal.

Incidentally, the new coated flash reflector has been installed on the 100 and 225 Substrobes as well.

For more information or the location of your nearest authorized Ikelite dealer contact Ikelite Underwater Systems, 50 West 33rd Street, Indianapolis, IN 46208 or telephone (317) 923-4523. 

PADI COLLEGE NATTS ACCREDITATION

PADI International College recently became the first and only recreational diving instructor school to be accredited by NATTS, the National Association of Trade and Technical Schools. NATTS is recognized by the U.S. Department of Education as the accrediting agency for private trade and technical schools.

To receive this accreditation, the college had to pass a long and thorough examination of its educational programs and administrative procedures, as well as an evaluation of the teaching ability of its staff instructors. The accreditation process took almost two years.

Because NATTS is recognized by the Department of Education, students attending NATTS-accredited schools qualify to apply for scholarships, grants, financial aid and other assistance programs. Now that it is NATTS accredited, PADI International College is in the process of making Guaranteed Student Loans and other forms of state and federal aid available to its students.

PADI International College has been training diving educators for more than eight years. More than 2,500 students have graduated from its many instructor development and postgraduate courses. For more information contact the Office of the Dean at (800) 235-3434 (toll free inside the U.S.) or (800) 223-8697 (toll free inside California) or (714) 540-7234 (outside the U.S.). 

STUDIO GALLERY

Colorful pastel drawings of marine life, actually drawn underwater, on location, by the world's first underwater artist, Nick Peters, 303 Park Ave., So., Ste. 311-A, New York, NY 10010 • (212) 673-1523

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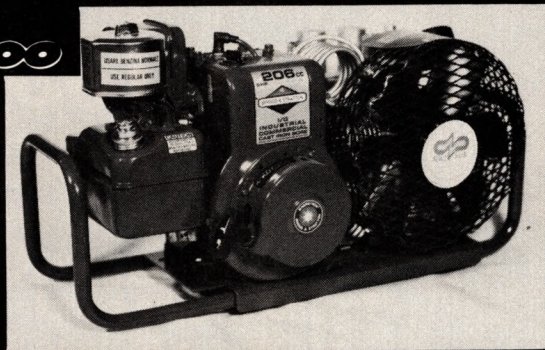


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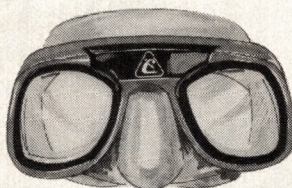
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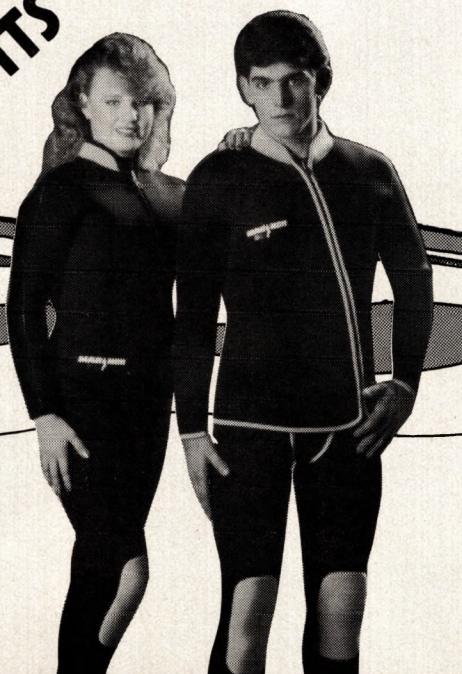
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LOBSTER

(Continued from Page 24)

hole or crevice, making it nearly impossible to pull free.

There are no books or instructional manuals on bug catching and it is not taught in basic scuba class. The success of any great hunt is the result of knowing the habits of the prey and the proper use of equipment. You should also know the legal limits allowed—including the size and quantity—and when the official season opens and ends.

In Florida, the carapace of the lobster must be a minimum of three inches long and the tail at least five and one-half inches long. Either size makes a lobster a legal candidate for dinner.

One of the greatest myths of the world is that only true lobsters have claws and all other species fall into some lesser known family. Nothing could be farther from the truth. In fact, all species with or without claws are "true" lobsters. Spiny lobsters without claws of the family Palinuridae are worldwide in distribution. They may vary in color and size and, depending upon the geographical area, may be called by a different name. Variations of the spiny lobster can be found throughout the tropical, subtropical and temperate waters of the Atlantic, Caribbean, Pacific and Indian oceans.

The Florida spiny lobster (*Panulirus argus*) gets its name from the numerous sharp horns around the head and sides. Two large spines point forward to protect the eyes. These are used on occasion by large bulls as defensive battering rams. The eyes are mounted on rotating stems, permitting the lobster to see in all directions. However, the crustacean has poor eyesight and generally relies on the long slender antennae. These are so sensitive to danger they are used more than the eyes for detecting enemies.

A quality pair of canvas gloves and a mesh goodie bag are all the equipment you need. A small round dowel about 24 inches long can be used as a tickler stick. Slide the tickler under the abdomen and between the legs, tapping the lobster gently. This simple technique will enable you to "walk" the lobster out of its home and into your goodie bag. Be careful not to touch the feelers, as this will spook the lobster and send it deeper into its home.

Sometimes a buddy team works well, with one diver enticing the lobster out of its nest, while the other grabs it from behind. Experts warn not to bag the lobster head first. Lobsters use their strong tail for backward propulsion. A head-first descent into your goodie bag could easily become a great escape.

While underwater, you must carry a measuring gauge to check the carapace of your catch. Hooks and spears are strictly prohibited and it is illegal to take

shorts or egg bearing females. These actions are heavily enforced by marine law officers; stiff fines and boat seizures are not uncommon.

Once the lobster is brought aboard the boat the meat will spoil quickly if the creature dies. It is best to ice your catch immediately in a cooler or other container. Fish and game laws do not allow detaching the lobster tail while at sea.

Night diving is an excellent time to go bug hunting. Lobsters are nocturnal feeders and they can usually be found crawling around in open water. A lobster may freeze when hit by the beam of your light, allowing you to figure out your mode of attack. You can either grab the tail, head or back, but remember, a lobster can jump in any direction. If you bump its tail it might flip right into your facemask.

One mistake in lobster hunting is cruising several feet above the reef or rocky outcropping. This works well at night, but during the day you must get down and look under every ledge and crevice.

Lobsters are not always found in clear water, some of the best places to hunt for them are in dirty water. Some of the best lobster areas are around jetties, beneath dock piles, old rubbish mounds and under mangrove roots.

After the lobster has been de-tailed, the best way to remove the intestinal vein is to find the small anal opening at the base of the tail. Take one of the antennae and gently push the tapered end into the opening, twisting as you do. After about an inch of penetration, carefully pull the antennae out, and with it the vein.

The meat can now be frozen or served freshly cooked in a bountiful array of lobster dishes. Good luck and happy hunting! 

KELLY RECEIVES VIKING DIVER AWARD

Francis Kelly, long-time YMCA scuba instructor, received the Viking Diver Award at Beneath the Sea '87, in Tarrytown, NY. The award included a Viking Pro Surveyor drysuit plus accessories.

Kelly, a diver since 1956, was instrumental in founding Mt. City Scuba Divers in 1961. He has been active in the club ever since. In addition, Kelly is a sergeant with the Luzerne County Sheriff's Department dive team and conducts their training programs each month.

The Viking Diver Award is given annually to honor the organizational diver who has given the most service to his or her diving group. The 1986 award was presented to Edith Hoffman, president of the Long Island Diver's Association.

For information and applications regarding next year's award contact Beneath the Sea, P.O. Box 444, Rye, New York 10580. A self-addressed, stamped envelope must be included. 



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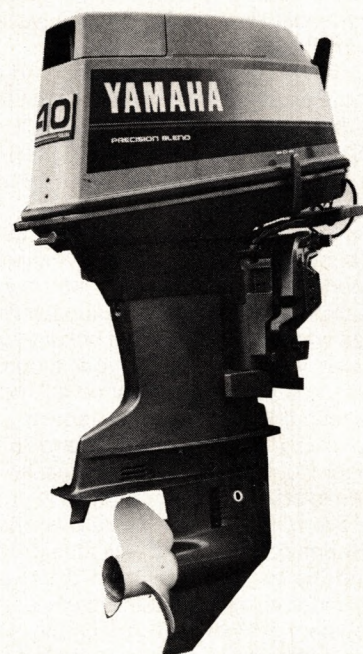
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YAMAHA

40

OUTBOARD

TEXT AND PHOTOGRAPHY
BY ERIC HANAUER

Power to spare is an overused cliché. But, when you are in a 15 foot inflatable boat with two other divers and full gear, and two-thirds throttle moves you over the swells faster than 30 miles per hour, that's power to spare. I never did open the Yamaha 40 all the way—for my own comfort and that of my passengers—because of the short interval chop. But, during an afternoon of diving off Laguna Beach, California, I had plenty of time to become familiar with this motor and to be impressed by its smoothness and power.

The Yamaha 40 is a three cylinder powerplant. This seems to be an ideal configuration for a mid range, two cycle engine and many manufacturers are adopting it. The advantages are a smooth, quiet idle that rivals a well-tuned car engine, as well as easy starting and plenty of power. People who are used to the vibration and sputter of two cylinder outboards at idle might wonder whether this one is really running. The tradeoff is

some added weight and the complexity of a three carburetor fuel system.

Yamaha offers six three cylinder engines, ranging from 30 to 90 horsepower. Even jet drive is available, making this 40 the smallest engine ever to offer that option. All of them offer state-of-the-art automatic oil injection.

An oil injected outboard offers two basic advantages. First, there is no need to premix gas and oil. Second, and even more important, the gas/oil ratio varies so the engine is always running cleanly, efficiently and economically. At idle, the mixture ratio is 200:1, to ensure adequate lubrication of the cylinder when the



The engine's tiller handle is conveniently located and an automatic kill switch can be activated via a lanyard that attaches to the driver's wrist.

engine is cold. It ranges down to 50:1 at full throttle to reduce exhaust smoke and plug fouling when the higher ratio is no longer necessary.

Yamaha's Precision Blend system responds to throttle position as well as engine speed. So, if the boat has a heavy load—like when it's full of heavy diving gear—the system will respond to the forward throttle position and add more oil, even though engine speed is still moderate. Oil is injected directly into the manifold, bypassing the carburetors. This prevents the carburetors from becoming gummed up with oil, resulting in more time between overhauls, especially with a three carburetor system. There is an integral oil tank under the cowl that will hold enough for as long as five hours running at wide open throttle before refilling.

This is an easy motor to run with manual controls. The tiller handle is a convenient size and in the right place, although the shift lever is mounted on the starboard side. An automatic kill switch can be activated via a lanyard attached to the driver's wrist. In the unlikely event the driver falls overboard, the motor would stop immediately. The switch is activated by means of a plastic wishbone that keeps the circuit closed. If something happens to the driver, the lanyard pulls the wishbone out, breaking the contact and shutting down the motor's electrical system. I must admit I left the lanyard wrapped around the engine handle during our tests because I had enough confidence in the boat and motor not to worry

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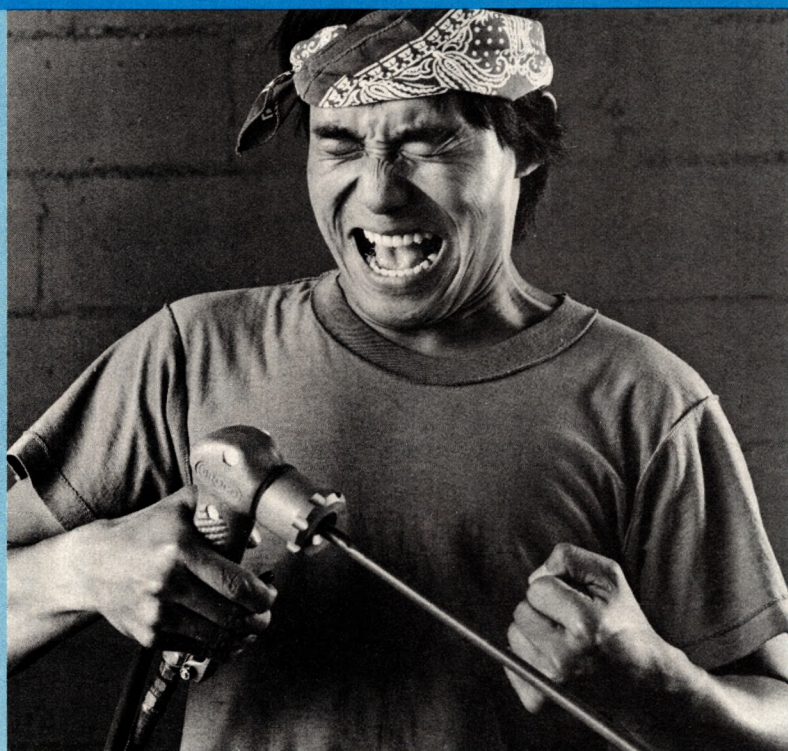
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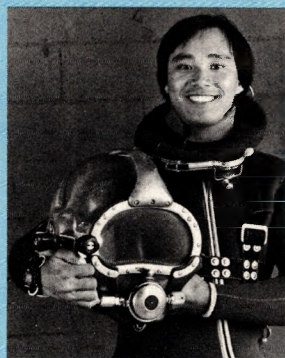
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YAMAHA 40

about it. But, the boating industry seems to have adopted this feature for faint-hearted skippers.

We tested the Yamaha 40 during a day of diving off the coast of Laguna Beach. Scott McIntosh of Port-a-Marine, Costa Mesa, California had set up two Achilles inflatables for us, powered by two Yamaha engines. This allowed George Cozens and me to compare them side by side, and to shoot action photos from the second boat. The 40 was an easy motor to like. It brought us right up on a plane and kept us there despite going uphill into



The Yamaha 40 horsepower outboard is a three cylinder powerplant that features easy starting and a smooth, quiet idle. Jet drive is optional.

short interval wind chop. It ran smoothly, both at idle and on short runs at full throttle. On sharp turns, I had to throttle back to prevent cavitation. But, with smoother conditions or a greater load on board, that would not have been necessary.

The Yamaha 40 would be an ideal motor for a diver's 15 foot inflatable. Since it performed so well with three divers aboard at two-thirds throttle, we can safely assume the addition of a fourth diver and gear still wouldn't tax this motor to its limits. If that meets your requirements, it's available at your Yamaha dealer. The suggested retail price is \$2,765.

YAMAHA 40

Engine type.....	3 cylinder, 2 stroke
Displacement	698 cc (42.6 cubic in.)
Bore & stroke	67 x 66 mm
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Lubrication.....	Precision blend injection
Oil capacity	1.4 quarts
Ignition system.....	Capacitive discharge
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DIVERS' WORLD OF KEY LARGO

Captain Corky's Divers' World of Key Largo has recently expanded its instructional staff with the addition of NAUI instructors Tammy Mrkvicka and Betsy Franklin. Under senior instructor Todd Stephenson, the versatile staff can now offer NAUI, SSI and PADI certifications.

Mrkvicka, who completed her instructor training in nearby Islamorada, has considerable background in the diving business. She is an experienced mate aboard Captain Corky's three dive boats.

Franklin hails from Rhode Island and previously taught scuba with Five Fathom Divers and the Brown University diving program. She gained leadership level instructional experience with NAUI College. A Red Cross certified CPR instructor, she will offer a variety of specialty courses, including rescue and divemaster, in addition to open water training.

Divers' World welcomes open water referrals from SSI, PADI and NAUI teaching facilities, and offers all its students and divers the opportunity of having their underwater adventures videotaped. For information contact Captain Corky's Divers' World at P.O. Box 1663, Key Largo, FL 33037; (305) 451-3200. 

CAYMAN MARITIME MUSEUM

The Cayman Maritime Museum and Shop is currently under construction along the waterfront in George Town, Grand Cayman. The museum's exhibits and artifact displays are being designed by Presentations South, Inc. (they created Pirates of the Caribbean in Orlando's Walt Disney World). The exhibits and displays will tell the stories of Spanish treasure fleets; raids by buccaneers; and Caymanian turtling and boat building. The development of diving, marine salvage and underwater archaeology will also be featured. Gold and silver coins, precious gems, ancient muskets, Spanish pottery, Chinese porcelain, pre-Columbian and Aztec jewelry, and swords from the *Maravilla*—all recovered in Bahamian waters by Marine Archaeological Research Limited (MAR)—will be exhibited. A cannon, large anchor and variety of weaponry recovered from the HMS *Thunderer* off the coast of Jamaica by MAR, Ltd. will also be shown.

Art Hartman, vice president of MAR Ltd., is donating a collection of Indian artifacts, pistols, bayonets, iron and brass spikes, axes and domestic utensils.

The museum is open Monday through Saturday, from 9:00 am to 5:00 pm. It is the brainchild of Herbert Humphreys, Jr., owner of the local Holiday Inn, and Kem Jackson, chief engineer of MAR Ltd. Chalmers, Gibbs, Martin and Joseph is doing the architectural engineering. 

FLORIDA KEYS

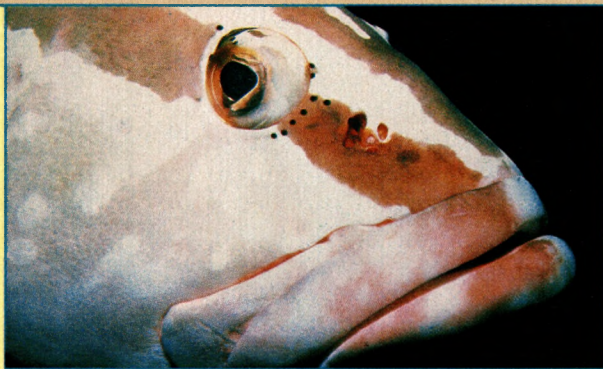
SKIN DIVER MAGAZINE'S GUIDE TO FLORIDA'S TROPICAL ISLANDS



PHOTOGRAPH BY STEPHEN FRINK



The Florida Keys, "The Islands You Can Drive To," offer a flavor similar to a sophisticated Caribbean island, yet there are no immigration considerations, the language is English, electricity is reliable and 110 volts at 60 cycles. Here, tropical ambiance can be enjoyed in the continental U.S. Keys diving requires the services of a boat. Dives on most coral reefs will be in depths of 20-40 feet and there is an extensive range of vibrant marine life, with each area's offerings slightly different.



FLORIDA KEYS

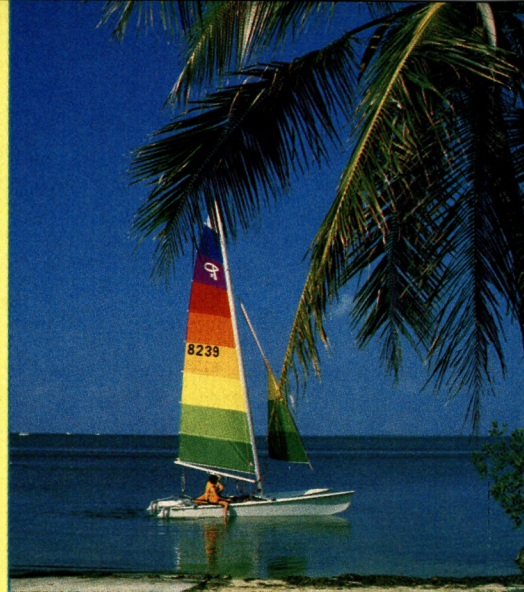
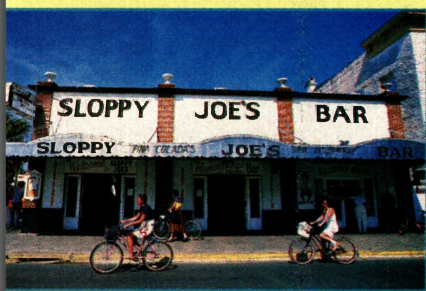
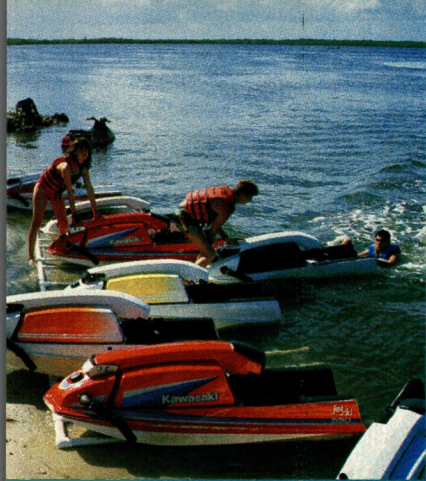
AMERICA'S
WARM WATER
PARADISE

TEXT AND PHOTOGRAPHY BY STEPHEN FRINK

As the Florida Keys continue to evolve as one of the world's premier dive vacation destinations, it is interesting to consider the geological and social accidents that make them so attractive. In ancient times these islands were but patches of coral awash in a tropical southern sea. As the ocean's waters receded these coral reefs were exposed to the sun and winds. The corals died but left their calcareous exoskeletons. Today, these anchor the soil and vegetation that make up the more than 200 islands and keys comprising the Florida Keys. Palm trees, flowering tropical plants, mangroves and a dense hardwood hummock provide lush, colorful contrast to the brilliant blues and greens of the waters just offshore. These islands have matured and now separate the shallow flats of the Florida Bay and the Gulf of Mexico to the west from the crystalline waters of the Atlantic to the east.

Gradually, more coral reefs formed offshore, replacing those left high and dry. Today, there exists an extensive fringing reef system four to six miles to seaward, paralleling the entire length of the Keys. No other area in the continental United States offers the density, diversity and beauty of the coral reefs that so magnificently typify the underwater resource just seaward of the Keys.

The beauty and bounty of the sea meant as much to the earliest inhabitants of these islands as it does to the thousands of dive tourists who visit today. The fierce Vescayno and Matecumbes Indians main-



The Florida Keys offer a tremendous variety of watersports, including Jet Skiing, sailing, windsurfing and fishing. There are diverse restaurants offering everything from fast food to ethnic cuisine to seafood. Dive sites include underwater sculpture, coral beds and wrecks. There is even an atoll that can be reached in good weather with a fast boat or a live-aboard dive vessel. The Keys Association of Dive Operators ensures a high level of professionalism is provided by its members.

tained no permanent villages, but traveled from island to cay in their pirogues, living on fish, turtles, shellfish and manatees. This rich sustenance was occasionally supplemented by stores salvaged from the ships of the first Spaniards who fell victim to the shallow, treacherous reefs. However, by the 1570s, the Spanish influence was as evident ashore as it was along the seaways and the populations of Indians declined.

The Calusa Indians populated the Keys somewhat later and, to an extent, coexisted with the Spaniards. However, they were victimized by the Spanish slavers and subjected to the diseases of the Old World. The Calusas made their last stand after the Spanish departed and were replaced by settlers from the Bahamas. In 1840 a savage massacre of the settlement on Indian Key by the Calusas brought reprisal by U.S. troops. The tribe was effectively decimated by Colonel William Harney near Lake Okeechobee.

The sealanes off the Keys, known as the Florida Straits, were the route of large merchant ships. Loaded with riches in Havana, they were protected by armed galleons and bound for Spain. To understand why so many of these ships went to the bottom of the sea off the Keys you must consider the massive extent of the reef system; the poor state of existing nautical charts and inadequate navigational instruments; as well as the effects of sudden storms that could not be predicted accurately. Even with an immense deep water ocean offshore, these sailing vessels still had to skirt the pulsing current of the Gulf Stream, which flows like an indigo river through the Atlantic. The momentum of the Gulf Stream could retard the progress of a southbound ship by at least 70 miles per day. Thus, many of the ships risked disaster on the coral reefs in order to sail along the inside of it to hasten their voyages.

In the 16th, 17th and 18th centuries the Spanish Plate Fleet followed the prevailing southeast winds to Spain. Those that arrived safely made Spain the richest and most powerful country in Europe. Yet, many of the ships did not survive the voyage and, as a result, countless wrecks dot the reefs and shallow sand bottom off the Florida Keys. Some, such as *Nuestra Senora de Atocha* and the *Santa Margarita*, sunk in 1622 in the waters off Key West, have disgorged millions of dollars worth of silver, gold, emeralds and artifacts to modern day treasure hunters such as Mel Fisher.

Pirates were an additional hazard to navigation in the early stages of Florida Keys civilization. Blackbeard, Gasparilla and Black Caesar were among the most feared brigands of this era. While the pirates may have intentionally brought an end to many an unsuspecting galleon, the wrecking industry took advantage of the more naturally occurring disasters.

The wreckers were skilled sailors with fast, sturdy ships. They would venture

FLORIDA KEYS

forth in stormy seas to rescue victims and salvage the disabled ships run aground. In 1828 a U.S. court with full jurisdiction over maritime matters was established in Key West and wreckers were licensed and regulated. For many years following, a wreck a week was the average spoils from the sea. By 1850, the commerce that derived from the salvage and sale of goods, along with the proceeds from cigar making and sponging, made Key West the wealthiest city per capita in the United States.

In 1852 the U.S. government began erecting a series of lighthouses, the first



constructed at Carysfort Reef off Key Largo. These efficient aids to navigation brought the end of the great wrecking period. In December 1921 the Wrecking License Bureau closed forever.

The traditional dependence upon the sea for transportation in the Florida Keys changed with the construction of the Overseas Railroad. The Key West extension of the Florida East Coast Railway connected the Florida mainland and Key West. Crossing 29 emerald hued islands with sturdy bridges and embankments, the Overseas Railroad was alternately called Henry Flagler's Folly and the Eighth Wonder of the World. It defied the winds and weather of the Atlantic Ocean for 23 years until a tragic hurricane September 2, 1935 brought an end to the venture. It took 12 years and an estimated \$27 million pre-depression dollars to connect the Florida Keys, but just a few hours of 200 mile per hour winds and waves brought the demise of Flagler's dream. During the Depression the Overseas Railroad went into receivership and the railroad right of way and still standing bridges were sold to the government for \$640,000. This was less than the cost of constructing a single bridge. Today's Overseas Highway, the concrete auto artery so essential to Keys' commerce, was superimposed over the railway's path and remains the greatest monument to an

immense engineering marvel.

Since the Keys are so dependent on U.S. 1 (the Overseas Highway) for interisland transportation and commerce, most addresses refer to their position along the highway. A system of Mile Marker numbers has evolved. It originates at the Monroe County Courthouse in Key West as Mile Marker #0 and culminates just one mile south of Florida City with Mile Marker #126. If you are driving along the Overseas Highway and the small, green informational number signs along the roadway get progressively larger, you are headed north. A decreasing sequence assures a southerly heading. The major centers of population are the Upper Keys, approximately from Mile Marker #106 to #85, the Middle Keys from MM #55 to MM #45, and the Lower Keys from MM #18 to MM #0.

Touted as the "Islands You Can Drive To," the Florida Keys are accessible by automobile, boat or airplane, with a private airstrip at the Ocean Reef Club on North Key Largo and municipal airports at Marathon and Key West. Most tourists fly into Miami or Ft. Lauderdale and rent a car or drive directly to the Keys from their homes. While the flavor of the Keys is quite like a sophisticated Caribbean island, there are no immigration considerations for U.S. citizens. Just as obviously, the currency is the familiar U.S. dollar, the language is English, the electricity is reliably 110 volts, 60 cycles, operating 24 hours per day, and there is ample fresh water with good pressure. One of the real joys of a Florida Keys vacation is the possibility of enjoying the tropical ambiance within the familiar confines of the continental United States.

Many of the divers who visit the Florida Keys are experiencing their first warm open ocean dives after having been certified in the frigid waters of the north. They find the Keys' experience a pleasurable, non-threatening introduction to the joys of destination diving. Other divers repeatedly visit the Florida Keys to enjoy convenient, fine diving close to home with minimal travel expense. Whether you are experiencing the Keys as a first time visitor, or as a seasoned "conch" (pronounced "conk" and referring to a long-time resident of the Keys, so named for the Bahamian settlers to the Keys who depended upon the flavorful crustacean as a dietary staple), the Florida Keys offers a wonderful variety of wrecks and coral reefs in warm, clear tropical waters.

The prevailing weather in the Keys is quite pleasant on the whole. In terms of averages, the typical day will be sunny (there will probably only be 27 inches of rainfall for the year), the mean annual temperature will be 75°F, the winds will be mild and the water temperature will be 76°F with 40 to 50 feet of lateral visibility and a two to three foot wind chop. The average day in the Florida Keys is, most assuredly, beautiful. However, there are two distinct seasons—summer and win-

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ter—and the predominant climatic conditions specific to these seasons should be considered when planning a dive trip to the Keys.

During the winter (November through March) the average air temperature is 74°F. Afternoons in the 80s are not unusual, nor are cool winter evenings in the 60s. There may be four to six cold fronts during the winter. These may bring accelerated winds and rougher sea conditions, but a look at the sub-zero temperatures throughout the frozen north makes an occasional cool wind in the Keys seem positively balmy.

The winter dive season is characterized by water temperatures ranging from the mid 70s to a seasonal low of about 69°F. The visibility can range from 100 feet on an exceptionally clear day to 30 or 40 feet on an average day. It generally takes a sustained wind to keep the seas stirred up so that visibility drops below 30 feet and a single tidal shift can bring the clear water back. The direction of the wind may have more to do with probable visibility than the intensity of the wind. A dive site's proximity to cuts or channels connecting the more turbid bay waters with the clearer ocean waters will also have an effect. Your Florida Keys dive operator will have considerable experience in reading wind and weather conditions and will be able to suggest the areas where conditions will be optimal. For example, a strong wind from the west and an outgoing tide may bring marginal visibility to a dive site at the south end of Marathon owing to the wide expanse of gulf and ocean confluence at the Seven Mile Bridge area. However, a more northerly dive site off Marathon will be protected by the island's mass and will be much clearer; that would likely be the day's dive of choice.

There is a short spring season in April and May where the water gradually warms back up to the mid 70s, visibility tends to consistently improve and the winter winds abate. The summer season, June through October, is really the finest time for diving in the Florida Keys, however. Daytime high temperatures may soar to the 90s, but are moderated by cooling breezes. The water temperature climbs to the mid 80s and the 3/16 wetsuits of the winter season give way to bathing suits or body suits as thermal protection is no longer necessary. With the winds consistently diminished and the cleansing Gulf Stream bringing crystalline Caribbean waters to the reefs of the Florida Keys, summer visibility can easily

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range from 60 to 100 feet. The consistency of superior diving conditions, coupled with generally lower hotel rates, makes the Florida Keys one of the world's most popular dive destinations over the summer months. Knowledgeable divers realize that September and October feature the same spectacular summer dive conditions with much smaller crowds on the dive boats and may opt for an autumn Keys excursion.

Divers planning a Florida Keys vacation should be aware that a certification card is an absolute necessity for participation in scuba activities. While this should be no surprise to anyone, the number of shops that would like to see a logbook as an indicator of diver experience level may be. The dive operators of the Keys see massive numbers of divers every year. All experience levels are represented. While most of the diving is not challenging since it is reasonably shallow, surface conditions such as chop or current can change a dive suitable for novices to one for advanced divers. There are more shipwrecks being sunk every year as artificial reef sites. These are typically sent to the bottom at 100 feet or more so they will not be hazards to shipping. These deeper wrecks also require greater experience. For the dive operator to feel comfortable about his clientele under all possible conditions, the logbook is the only reasonable gauge.

Once the decision has been made to dive the Florida Keys, a wide variety of options exist regarding lodging. Typically, the dive operator will have a hotel or condominium complex that offers package price incentives. Be sure to investigate dive/lodging packages when making advance reservations with the dive shop. For those who wish to book lodging independent of diving, there are large international resort hotels, intimate local lodges, campgrounds, guesthouses, condominiums, motels and trailer parks. Many of the dive shops have toll free reservation lines and are happy to advise you regarding lodging options as they accept your dive reservations. Local chambers of commerce will also be helpful in this regard.

The restaurants of the Florida Keys offer tremendous diversity. Regional cuisines such as French, Polynesian, Mexican, Italian, Chinese and German supplement a wide variety of seafood restaurants and fast food establishments. Night life is also better developed in the Keys than in most dive destinations. There are

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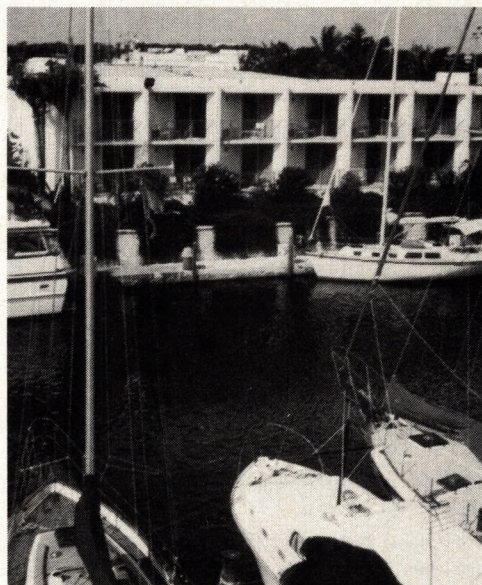
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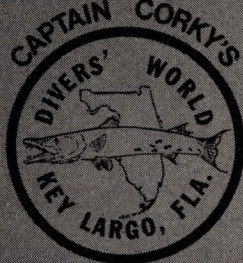
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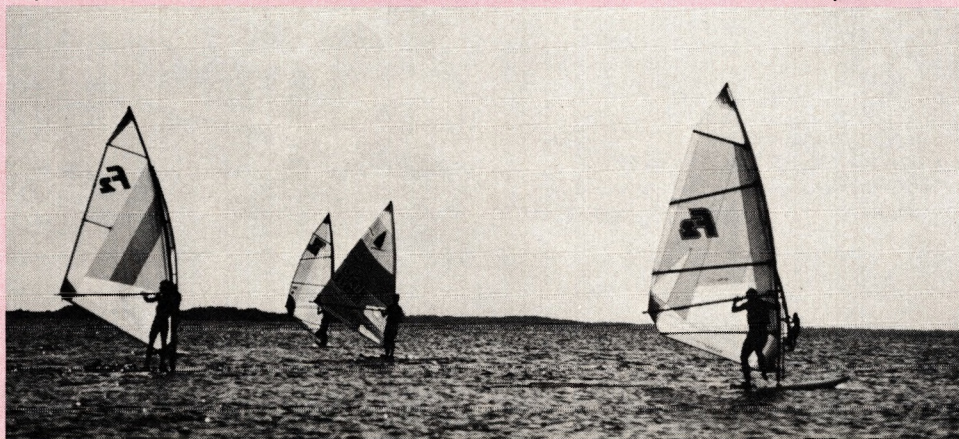
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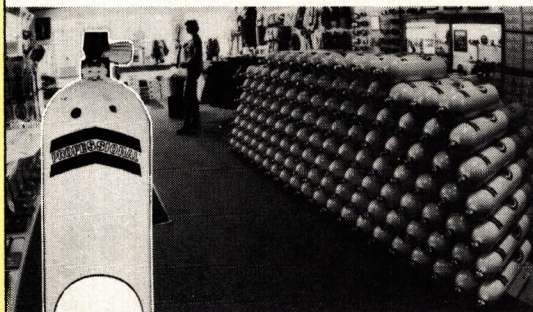


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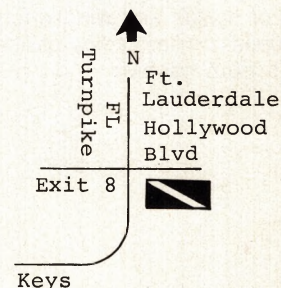
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FLORIDA KEYS

night clubs with live entertainment, theater, dive shop sponsored activities such as slide shows and barbecues, cable color TV in most hotels and, of course, a most popular evening activity—night dives. The Keys offers a nice compromise between the availability of activities beyond diving and complete services for the diving enthusiast.

Recreational anglers began fishing the Florida Keys as early as 1900 for the tarpon and bonefish so prevalent in the shallow sand flats on the ocean side and the extensive back country of the Florida Bay and Gulf of Mexico. In the late 1940s, better fishing boats and improvements in tackle design made offshore game fishing popular as well. Today, an extensive sport fishing fleet has developed and impressive catches of permit, tarpon, sailfish, white and blue marlin, dolphins, wahoo, blackfin tuna, groupers, snappers and sharks are proudly displayed as the fleet returns each day at dusk.

For sailors and windsurfers, there are countless miles of fine sailing in the waters both bayside and oceanside. Jet

Skis and parasails are also available for rent, as are canoes to paddle through the extensive mangrove channels. Bird watchers and nature enthusiasts will be thrilled with the populations of colorful wading birds such as the roseate spoonbills, blue herons, white herons, brown pelicans, ibis and egrets.

If a day away from diving can be scheduled, a tour through the Everglades National Park can be most rewarding. Near Florida City, just 20 miles north of Key Largo, the Everglades offers a subtle, serene beauty. "Here are no lofty peaks seeking the sky, no mighty glaciers or rushing streams . . . Here is land, tranquil in its quiet beauty, serving not as a source of water but as the last receiver of it." These are the words of Harry S Truman at the dedication of the Everglades National Park, describing a river of grass essential to the whole South Florida ecosystem. Within this incredible expanse of sawgrass, mangroves and tropical hardwoods are the breeding grounds for many of the reef residents so plentiful offshore. This is also home to alligators and crocodiles, the endangered Florida panther and a truly incredible variety of bird and plant life.

Diving in the Florida Keys definitely requires the services of some sort of boat. Beach diving is not practical since the reefs are at least four miles offshore and more like six in most areas. The visibility is not nearly as good close to shore as it

is out on the reef owing primarily to the effects of the Gulf Stream, but also because the shallow, muddy bottom close to shore is more easily stirred up. For the most part, sand, mud, turtle grass and an occasional tropical fish are the only sights just offshore. However, a snorkeling trip through the mangrove areas provides an interesting glimpse of a remarkable ecosystem.

The Keys has developed a remarkable fleet of dive boats. The vessels in service will typically be U.S. Coast Guard approved and range from 30 to 65 feet in length to accommodate 6 to 48 passengers. The boats will generally be customized for diver convenience with tank racks; extended ladders attached to wide, sturdy dive platforms; covered areas for spray protection and open decks for sunbathing; VHF radio at the very least and probably Loran, depth finders and stereo cassette in addition; and oxygen for diver safety. Many boats will also offer U/W photo convenience options such as film changing tables, freshwater rinse tanks and air hoses for blowing off water. Most crew members will be CPR and first aid trained. The Keys Association of Dive Operators (KADO) has established a code of ethics describing the services and level of professionalism required of its membership. The majority of the dive operators throughout the Keys abide by these standards.

The dives on most of the coral reefs



throughout the Keys are relatively shallow (20 to 40 feet) and are most often not conducted as guided dives. There will be a captain and mate on the boat ready to assist should a diving problem occur, but the diver's buddy is considered the most direct form of aid in a diving emergency. Divers are assumed to be responsible and able to tour the reef at their own pace and end up back on the dive boat with at least 500 psi in their tanks. Should a guided dive be desired in order to refresh rusty diving skills, or simply to assure that the best portions of the reef will be covered, it should be arranged before the boat leaves the dock.

Scuba instruction at all levels from open water through instructor certification is available and specialties such as underwater photography are especially well served. Quick E-6 film processing is available in Key Largo, Islamorada, Marathon and Key West; and one hour print processing may now be found in nearly every community throughout the Keys. Instruction at all levels of underwater still and video work may be booked and still and video cameras are available for rent or sale in several locations. There are underwater diver propulsion vehicles for rental, an underwater habitat for aquanaut training and even a plush underwater hotel for those who wish to live, sleep and eat underwater. If it has to do with diving or some level of diver service, it is more likely to be found in the Florida

Keys than anywhere else on earth.

Each of the dive areas of the Florida Keys has a slightly different flavor and attracts its own very loyal followers. The following will examine each of these areas in order of geographic placement from north to south.

UPPER KEYS

Key Largo, Tavernier and Islamorada comprise the primary centers of population in the Upper Keys. North of Key Largo there is the Ocean Reef Club, an exclusive residential community served by a quality dive center, but this is generally inaccessible to the average tourist.

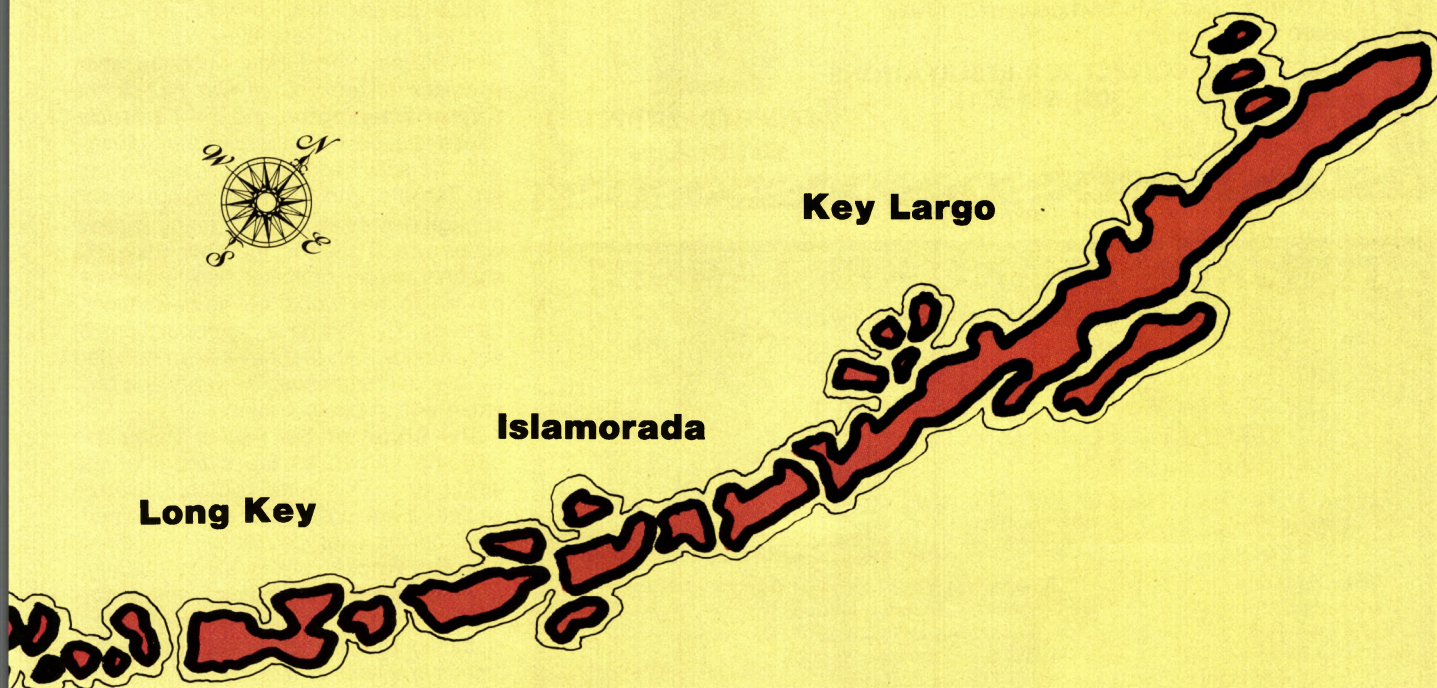
Key Largo is the site of the John Pennekamp Coral Reef State Park and the adjacent Key Largo National Marine Sanctuary. Some confusion seems to exist between the nomenclature in terms of where the best diving actually occurs. Remember, the Keys feature fringing reefs four to six miles offshore. The shoreline is tremendously important in terms of maintaining the quality of the water on the reef. Pennekamp Park protects that shoreline and the shallow water to about three miles offshore. It is here, with an entrance at Mile Marker #103, that the State of Florida maintains the campgrounds, beaches, boat ramps and a visitor center with aquarium that attract at least 500,000 visitors annually. Dive and snorkel boats, glass bottom boats, sailboats and canoes are available within the

park from private concessionaires.

The Key Largo National Marine Sanctuary boundaries are approximately three miles offshore to the 300 foot depth and management of this area is federal rather than state. The combined park and sanctuary encompass 183 square miles, but it is within sanctuary waters that virtually all of the best diving happens.

The proliferation of dive services offering trips to the sanctuary is immediately apparent given the number of red and white diver down flags that adorn the highway in Key Largo. Each offers dives within the sanctuary. Since the protected area includes a 21 mile stretch of reef-line, each operator will have favorite reef areas close to its boat docks. For example, the dive shops with boats moored in north Key Largo will dive the north end of the sanctuary, basically from Carysfort Reef and the Elbow to the north to French Reef to the south. Dive boats docked at the south end of Key Largo—near MM #99—will be more inclined to dive the southern reefs such as Molasses and French and only occasionally range as far north as the Christ statue or the Elbow. Since each of the reefs is uniquely appealing, the choice is subjective.

Carysfort Reef is at the far northern end of the sanctuary and marked by a 112 foot lighted steel tower. It was named for the British vessel HMS *Carysford* (erroneously converted to Carysfort over the years) run aground here in 1770. The



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FLORIDA KEYS

reef has an unusual configuration with an impressive concentration of hard corals in the shallows that tends to thin out as the depth increases. A fairly sparse limestone and sand bottom is decorated with sponge and soft coral shelves at 35 feet and then drops sharply to 65. A sand channel more than 100 feet wide separates this reef from a second reef that rises to 35 feet before gradually sloping again to seaward.

South Carysfort is becoming a popular new reef for dive traffic. In an effort to expand the traditional dive sites within the sanctuary, this beautiful reef area is now marked by four foot diamond shaped day beacons and accessorized with mooring buoys. Similar in terms of coral and marine life to Carysfort, South Carysfort features magnificent concentrations of healthy elkhorn coral in the shallowest areas and a well defined spur and groove configuration sloping off toward mid-reef.

The Elbow is a fairly broad reef structure that encompasses several coral reef dive sites and a couple of interesting historical shipwrecks. Jutting out like a crooked arm into the blue water of the Gulf Stream, the Elbow attracted shipwrecks such as the **Civil War Wreck**, the **City of Washington** and the **Towanda**. These vessels have merged their identity with the sea, becoming absolute havens for fish life and thoroughly coral and sponge encrusted. Like so many shallow water wreck sites in the sanctuary, the superstructures of these vessels were removed so they would not be navigational hazards. They do have big populations of very friendly fish that have been handfed by dive operators over the years and now make willing photo subjects.

The **Christ of the Abyss** statue has become known as the symbol of the sanctuary. This nine foot tall bronze sculpture was erected on a concrete pedestal on the east side of the reef structure, **Dry Rocks**, off Key Largo in 25 feet of water. Originally donated to the Underwater Society of America by Edigio Cressi, the figure is a duplicate of a statue that stands in 50 feet of water off Genoa, Italy. With arms upraised to the surface, the Christ figure appears to be beckoning to the multitudes visiting this reef each year. Fish feeding activity in this area has further contributed to the already impressive tropical populations. This is one of the best areas in the Keys to photograph consistently approachable barracudas.

The **Benwood** wreck lies in waters ranging from 25 to 45 feet deep. She ran aground after an unfortuitous cruise that

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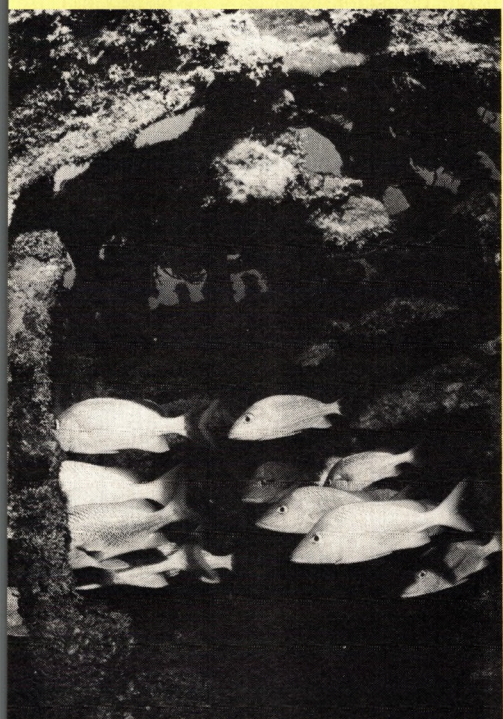
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included being torpedoed by a German U-boat and rammed by an American boat. Her superstructure was removed and, while she is a large ship, she can be thoroughly explored on a single dive. Beneath the deck plating and around the hull are found moray eels, lobsters, glass minnows, copper sweepers and groupers. A huge school of porkfish will be found near the bow and massive groupings of goatfish and grunts hang around the perimeter of the ship.

The primary focus of the dive activity on French Reef is the swim-through caves and overhanging ledges that are so prevalent. With openings three to four feet high and carved out of limestone rock, the caves often lead to larger caverns populated by copper sweepers, groupers and, in the summer, glass minnows. Mooring buoys on French Reef—there are more than 100 scattered throughout the sanctuary—mark the finest dive sites and permit the boater to tie up without risking damage to the precious corals below. With more than 70,000 boats visiting the sanctuary annually, the mooring buoy system helps preserve the beauty of the corals from anchor damage and prevents chafing from improperly placed lines.

Molasses marks the southern boundary of the sanctuary and is possibly the most dived reef in the world. Easily located because its shallowest area is marked with a 45 foot steel lighted tower, the best diving occurs along the spur and groove formations to seaward. Beautiful high profile corals, massive schools of grunts and snappers, friendly scrawled filefish, moray eels, Atlantic spadefish, schooling barracudas, inquisitive angelfish and a southern stingray that can be handfed are all vignettes of the subtle beauty of Molasses. Her beauty is her curse, however,



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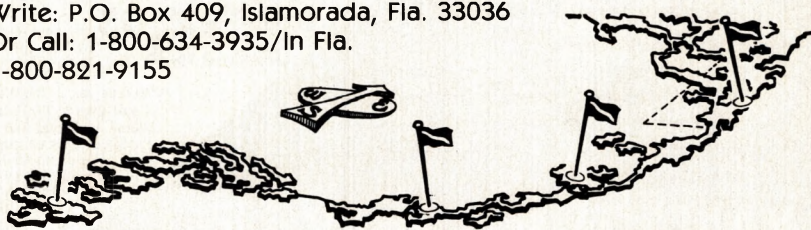
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**FLORIDA
KEYS**

as incredible numbers of divers plunge beneath the waves to visit her. Too often the diver will carelessly knock against the fragile corals, rest a gloved hand on a brain coral, or shuffle through the elkhorn on a photographic quest. These repeated and callous encounters will scar any reef, but considering the numbers of divers who visit Molasses, extraordinary care must be exercised.

Pickles Reef is just two miles south-west of Molasses and popular with dive shops from Key Largo and Tavernier. The low profile reef sits in 10 to 22 feet of water and is especially productive for the macro photographer. Flamingo tongues, nudibranchs, flame scallops, scorpionfish and many marine life juveniles are found among the brilliant seafans and delicate gorgonians that festoon this reef.

Conch Reef includes both a shallow area and a steep drop-off from 60 to 100 feet. A boat will often anchor along the rim of the drop-off. Divers will gradually descend along the wall face and observe deep water gorgonians, pelagic species such as eagle rays, hawksbill turtles and, occasionally, bull or blacktip sharks. In the shallows of the reef, an area known as Pillar Coral Patch offers excellent concentrations of this hard coral.

Shipwrecks as artificial reefs have become magnificent additions to the dive offerings of the Florida Keys. The **Eagle**, sunk December 19, 1985 in 110 feet of water off Islamorada, is a tremendously successful example of this program. The ship was purchased with funding generated by local dive interests, concerned citizens, the combined Key Largo and Islamorada Chambers of Commerce and the Monroe County Tourist Development Council. She was prepared for sinking by having potential dive hazards removed and was towed to the Keys to be intentionally scuttled. The 287 foot *Eagle* now sits on her starboard side. She is hostess to amberjacks, huge schools of tomtate grunts, Spanish sardines, parrotfish, groupers and even an occasional jewfish. There are encrusting sponges and hydroids growing on the freighter now, and macro life such as arrowcrabs enjoy abundantly fine grazing.

Davis Reef is an interesting shallow dive with excellent seafans and soft corals providing contrast and protection to the huge schools of grunts, and frequent nurse sharks and lobsters lurking beneath the ledges. Davis Reef, along with myriad other dive sites, provides the dive operators of Tavernier and Islamorada with excellent diving opportunities. These

other sites include: **Hens and Chickens** in only 22 feet of water and characterized by a collection of huge star coral heads; **Crocker Reef** with a sloping reef face from 35 to 50 feet; and the **Gully** with tremendous schooling fish activity along a series of colorful coral ledges. While spearfishing is permitted on all of these reefs except Hens and Chickens, it seems that underwater photography has outpaced spearfishing. It is now the number one activity in this area as well as within the sanctuary.

MIDDLE KEYS

The Long Key Bridge marks the approximate point of transition between the Upper and Middle Keys. Including the major center of population—Marathon, clustered around Mile Marker #50 on Key Vaca—the Middle Keys generally consists of Conch Key, Duck Key and Grassy Key. Duck Key is a scenic residential community with the Hawk's Cay Resort and Marina as the vacation centerpiece. Hawk's Cay Divers is farther north than the dive operators of Marathon and, consequently, will have some unique dive sites. Conversely, the dive operators in south Marathon will have accessible sites farther south, as far south as Looe Key, in fact. The happy result to the traveling diver is a tremendous range and variety of fine diving from a Middle Keys base.

Marathon is a deceptive community. For many years all I saw of it was the business district along the Overseas Highway. Until the recent completion of highway improvements through the center of town, that business district was congested. Now, traffic flows much more smoothly, but it will be worth your while to get off U.S. 1 and explore. The side streets offer interesting marinas, scenic fishing boats, beaches, beautiful residen-

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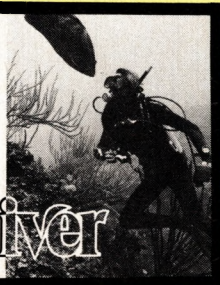
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FLORIDA KEYS

tial areas and tropical landscapes.

The Middle Keys dive profile includes shallow and mid-depth reefs as well as wreck diving. The **Thunderbolt** is the most exciting new addition to the Marathon dive portfolio. It has been down for one and one-half years now and is attracting considerable fish and invertebrate life.

The **Thunderbolt** was purchased as a derelict vessel in Miami. She was cleaned, made safe for diver access and then towed to her final resting spot. She now sits upright in 115 feet of water just south of the Vaca Cut off Marathon. In her work life the **Thunderbolt** was a cable layer and the huge spool for the cable is still prominent on the bow decking. The two bronze propellers are still affixed to the vessel and sit just above the sandy bottom, ideal for photography. The ship is 188 feet long, her beam is 37 feet and the top of her wheelhouse is only 70 feet below the surface. She attracts large schools of amberjacks that come to feed on the baitfish, which in turn graze on algae. Resident barracudas, a jewfish, parrotfish and most recently, a green moray eel, have come to inhabit the shipwreck. She can only improve with age and is already a wonderful dive option for the Marathon charter boats.

The swingspan of the **Seven Mile Bridge** is another interesting artificial reef, but since the **Thunderbolt** was sunk, it is dived less often. The metal gears that moved the massive bridge section are now heavily encrusted with spiny oysters, soft corals and sponges. Large schools of grunts and yellowtail snappers find refuge in the twisted edifice.

The **Duck Key Wreck** is another artificial reef, but of historical nature rather than intentional. Apparently the wreckage of an old steam powered freighter, her remains now include four large smokestacks, two boilers and lots of indefinable bits of brass rubble. The wreck stands above the lower coral structures and has attracted significant marine life, especially striped grunts and parrotfish. The depths here range from 20 to 25 feet and visibility is quite often excellent.

Probably the most popular Middle Keys dive site is **Sombrero Reef**, not only because of its beauty, but because it is marked by a 136 foot lighted tower visible to private boats that might otherwise be unsure of their navigation. Much of the diving off Marathon is spur and groove in configuration, and Sombrero is an excellent example of this reef structure. Depths range from very shallow to about 25 feet.

Within this range are hard corals such as pillar, star, elkhorn, staghorn and plate as well as lots of seafans and gorgonians. The multitudinous cleaning stations afford excellent photo potential as groupers, coney, and barracudas line up to improve their hygiene.

Coffin's Patch and **Delta Shoals** are other popular sites. While Coffin's Patch is more a collection of six mostly separate reefs in 20 to 25 feet of water spread over a large area, Delta Shoals is a spur and groove formation spreading out from a sandy shoal. Elkhorn coral is the predominant hard coral in the area and fish populations are quite abundant.

While the dive sites on the Atlantic side are the best options during most of the year, the winds can make these reefs uncomfortable to dive occasionally. This might be the time to arrange a dive to the **Content Keys**. On the gulf side and protected by low lying nearby islands, the depths range from just 8 to 15 feet with rounded brain and star corals providing refuge for a wide variety of juvenile and intermediate species. There are some fish here I've yet to see on the coral reef on the Atlantic side.

LOOE KEY

The Looe Key National Marine Sanctuary is a 5.3 square nautical mile area off Big Pine Key. It came under federal protection in 1981 in accordance with Title III of the Marine Protection, Research and Sanctuaries Act. A classic example of the spur and groove formations found all along the Florida reef tract, it was named for the HMS *Looe*, which sank in this area in 1744. Looe Key is now best known for the pristine coral reefs within its boundaries. One of the interesting aspects of the sanctuary is a complete coral reef ecosystem that may be observed within a relatively limited area. The **Fore Reef** features spur and groove, **Rubble Reef** is the remnants of fossilized coral rubble piled up by storms and high waves and **Reef Flat** is a sort of seagrass meadow. **Sand Plains** appears to be devoid of life until closer inspection. **Intermediate Reef** and **Deep Reef** offer the scuba diver even greater diversity and challenge. A discontinuous line of patch reefs borders the north of the sanctuary and features fine concentrations of soft corals, anemones, sponges and hard corals. With the sanctuary protected from spearfishing, coral collecting and fish trapping, the marine life is abundant, yet the crowds of divers are sparse (taking the Key Largo National Marine Sanctuary as a comparison). Most of the diving in Looe Key is from a base of operations on Big Pine Key, but upon request, a day trip from Marathon can be organized.

LOWER KEYS AND KEY WEST

Key West has a rich historical heritage, from pirates and Indians in the earliest recorded years, until the first actual title to

the land was granted Juan Salas in 1815 by the Spanish government. Salas sold to John Simonton in 1821 and the title was guaranteed by the 1819 treaty between Spain and the United States. Simonton was the first to plan the city of Key West, building and charting its deep harbor. Sponging, wrecking and cigar manufacturing were the early industries that supported Key West, but today it's tourism.

Key West has more variety and sophistication in terms of dining and lodging than is found elsewhere in the Keys. The city also offers museums, art galleries, historical exhibits, live theater, night clubs, jazz clubs and other musical entertainment. Duval Street is the most active shopping area with several blocks of boutiques, restaurants and bars competing for the visitor's attention. At one time Key West enjoyed a reputation as the singles destination of choice, and while there is still much to occupy a singles lifestyle, families on vacation comprise a higher percentage of the tourist population these days.

There are both scuba and snorkeling industries evident in Key West. There are a few boats that try to entice the visitors to Duval Street to join them for a harbor cruise or a quick snorkeling tour of Sand Key. There are also the more established dive shops with investments in retail storefronts, U.S. Coast Guard certified multi-passenger dive boats and a history of responsible business dealings within the community. I recommend a bit of research before joining any cruise. Be aware that scuba divers and snorkelers may both enjoy some of the more popular shallow reefs off Key West and may be accommodated simultaneously on the same vessel.

Sand Key is the most visible of the Key West dive/snorkel sites owing to the red

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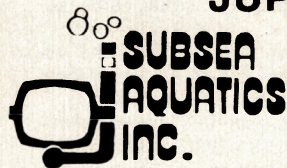
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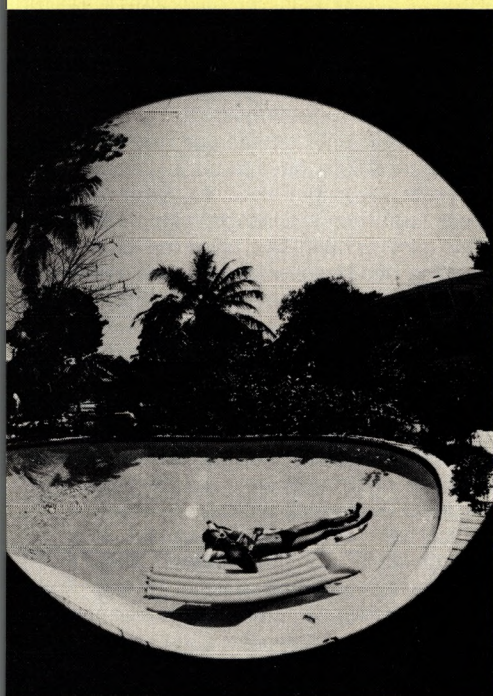
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UPPER KEYS RESTAURANTS

Italian Fisherman—Bayside at Mile Marker 104, Key Largo, 451-4471. Italian cuisine, fresh seafood. Breakfast, lunch, dinner. Major credit cards accepted.

Señor Frijoles—U.S. 1 at Mile Marker 104, Key Largo, 451-1592. Mexican food, tropical. Overlooking Florida Bay. Major credit cards accepted.

Sundowners on the Bay—U.S. 1 at Mile Marker 104, Key Largo, 451-4502. Steaks, seafood, salads, tropical drinks. Directly on the waterfront overlooking the Florida Bay. Major credit cards accepted.

T.J. Murphy's—U.S. 1 at the center of Key Largo Plaza, Mile Marker 103, 451-0032. Seafood and steaks, full bar specializing in tropical drinks. Major credit cards accepted.

The Fish House—Mile Marker 102.5, Key Largo, 451-4665. Fresh local fish, Dine in or take out. Lunch, dinner. Major credit cards accepted.

The Pilot House—Waterfront at the Pilot House Marina, Mile Marker 100, 451-3124. Fresh seafood, shrimp scampi, steak. Lunch, dinner. Major credit cards accepted.

The Quay—U.S. 1 at Mile Marker 101, Key Largo, 451-0943. Gourmet seafood and local delicacies, entertainment, indoor or outdoor dining. On the Florida Bay. Major credit cards accepted.

Coconuts—Mile Marker 100 at Marina Del Mar Resort, Key Largo, 451-4107. Steaks, sandwiches, seafoods, salads. Lunch and dinner only. Full bar service. Major credit cards accepted.

Greenstreets—At the Holiday Inn, Mile Marker 100, Key Largo. Seafood buffet nightly as well as other entrées. Luncheon buffet, Sunday champagne brunch. Major credit cards accepted.

Marker 88—Mile Marker 88, Plantation Key, 852-5503. Local seafood, continental cuisine. Major credit cards accepted.

Eric's Floating Restaurant—Houseboat at Mile Marker 85.5, 664-9141. Fresh seafood, choice meats. Major credit cards accepted.

Horizon at Holiday Isle—Mile Marker 84, Islamorada, 664-2321. Fine dining overlooking the Atlantic Ocean. Steaks, seafood, nightly specials. Major credit cards accepted.

Whale Harbor—Mile Marker 84, Islamorada (on the oceanside), 664-4959. Buffet and seafood. Major credit cards accepted.

Coral Grill—Mile Marker 83.5 Islamorada, 664-4803. Buffet featuring seafoods, prime rib, soups, salads, desserts. Major credit cards accepted.

MIDDLE KEYS RESTAURANTS

Hawk's Cay—Mile Marker 61, Duck Key, Marathon, 743-7000. Gourmet and continental cuisine in dining room; seafood, local favorites in casual dockside lounge. Major credit cards accepted.

The Quay—Mile Marker 54, Marathon Shores, 289-1810. Roast prime rib and local seafood. No reservations. Major credit cards accepted.

Perry's Fishery and Steakery—U.S.1, Mile Marker 51, Marathon, 743-3108. Seafood, steaks, raw bar. Major credit cards accepted.

Kelsey's—At Mile Marker 48.5, Faro Blanco Marine Resort, Marathon, 743-9018. Steaks, seafood, prime rib, veal, homemade desserts. Closed Mondays. Major credit cards accepted.

Castaways—Mile Marker 48 on the docks, Marathon, 743-6247. Closed on Sunday. Seafood, steaks, chicken, shrimp steamed in beer.

Baccus by the Sea—725 11th Street, Oceanside, Marathon, 743-6106. Outdoor dockside dining, lunch, snacks, dinner, cocktails. Indoor oceanview dining room opens at 5:30. Major credit cards accepted.

Brian's in Paradise—11050 Overseas Highway, Marathon, 743-3183. Breakfast, lunch, dinner, burgers, seafood, steaks, daily specials, cocktails. Major credit cards accepted.

Enrico's Italian Restaurant—4290 Overseas Highway, Marathon, 743-2990. Complete Italian cuisine, drinks. Open for lunch and dinner. Major credit cards accepted.

LOWER KEYS RESTAURANTS

Baltimore Oyster House—U.S. 1, Mile Marker 30, oceanside, Big Pine Key, 872-2314. Fresh seafoods, choice meats, raw bar. Major credit cards accepted.

Sugarloaf Lodge and Lounge—U.S. 1, Mile Marker 17, Sugar Loaf Key, 745-3741. Dolphin shows at 9:00 am, 1:00 and 5:00 pm. Fresh seafood, beef. Major credit cards accepted.

A & B Lobster House—Front Street, Key West, 294-2536. Lobster, shrimp, fresh local fish, salad bar, beef, etc. Major credit cards accepted.

Bagatelle—115 Duval Street, Key West, 294-7195. Caribbean cuisine with local seafoods and tropical fruits. Major credit cards accepted.

The Buttery—1208 Simonton Street, Key West, 294-0717. Gourmet cuisine, reservations suggested. Major credit cards accepted.

Capt. Hornblower's Jazz Club—300 Front Street, Key West, 294-4922. Native Key West cooking. Live entertainment nightly in the upstairs dining room. Visa cards accepted.

Dim Sum—613½ Duval Street, Key West, 294-6230. Asian cuisine. Closed on Sundays. Major credit cards accepted.

Gringo's Cantina—509½ Duval Street, Key West, 294-9215. Mexican food, frozen margaritas. Major credit cards accepted.

Half Shell Raw Bar—1 Lands End Village, Key West, 294-7496. Fresh local seafood. No credit cards accepted.

Kyushu Japanese—921 Truman Avenue, Key West, 294-2995. Sushi bar, entrées with rice and salad. Reservations recommended.

La-te-da—1125 Duval Street, Key West, 294-8435. Dining as part of intimate full service resort; seafoods, salads, vegetarian cuisine. Credit cards accepted.

FLORIDA KEYS

iron lighthouse erected here in 1853. The island is devoid of vegetation and composed of ground coral and minute sea-shells. The reef system consists of rocky fingers with deep gullies between them. There may be a 5 to 20 foot drop between the tops of the coral and the floor of the gully, with most of the coral sitting atop the ridges. Staghorn, elkhorn and fire corals are probably the most evident but star and brain corals are also represented. Wind, tides and wave action significantly affect visibility here. On a remarkable day, 100 feet is possible and during a winter storm only 15 to 20 feet might be reasonably expected.

The wrecks of Key West such as the **Cayman Salvager**, **Alexander**, **Curb** and others appeal to more advanced divers. Perhaps the most popular is the **Cayman Salvager**, a 180 foot steel hulled buoy tender intentionally sunk as an artificial reef in April 1985. The vessel now sits upright in 90 feet of water, shorn of her superstructure, hosting tremendous fish populations. The current that sweeps through bringing the clear water of the Gulf Stream can also make the diving challenging. When conditions are right the wreck is fascinating, especially for photographs of the friendly, accessible fish. The **Curb** sits at 185 feet with her shallowest portion at 120 feet. The former salvage tug is almost perfectly intact. It is an exciting dive, but the time passes much too quickly at this depth and several dives would have to be planned to thoroughly explore the wreck.

Since the **Alexander** sits upright in only 35 feet of water, the deep dive limitations of some of the other wrecks do not apply. However, since it is on the gulf side of the island, conditions have to be just right to generate favorable visibility. Since the wreck has been submerged since 1972, more coral growth has occurred on the one-time destroyer escort than on some of the more recent wrecks. Named for the local commercial salvor who sank her, Chet Alexander, she now sits five miles west of the #4 buoy. Broken in half, her stern section is 150 yards north of the bow. Sheepshead, Atlantic spadefish, porkfish, groupers, hogfish, snappers, angelfish and moray eels are all regular residents of this rich wreck.

Other sites especially popular with Key West divers include the **Western**, **Middle** and **Eastern Sambos** in 20 to 25 feet of water, **Ten Fathom Ledge** in 45 feet and other moderate depth sites such as **Rock Key**, **Eastern** and **Western Dry Rocks**. In addition, there is considerable explora-

tion being conducted along the mid-depth reefs at around 80 feet to bring greater diversity to the oft-dived locations. Here, the visibility is generally improved owing to the proximity of the Gulf Stream and, while the shallow reefs are typified by rich populations of marine life, seafans and soft corals, the mid-reef offers greater opportunities for pelagic encounters as well as deepwater gorgonians and barrel sponges.

The day dive potential from a Key West base is impressive from both a wreck and reef perspective, but when the weather conditions are just right for cruising farther offshore, the Marquesas offer yet another enticement. The only known atoll in the Atlantic Ocean, the Marquesas are likely the ancient remains of a meteoric impact. Herein lies the only frigate bird rookery in the United States, countless historical shipwrecks and a tremendous concentration of coral reefs.

If a fast boat is available and the sea conditions calm, the Marquesas can be experienced as a day dive. An overnight excursion is another, perhaps more viable, option and your Key West dive operator is best equipped to advise you regarding the availability of such a charter. Of course, with so much fine dining and evening entertainment available in Key West, the incentive to spend nights at sea aboard a ship is minimized.

CONCLUSION

The Florida Keys offer a wonderful combination of easy automobile access, diverse watersport activities, fine scuba and snorkel opportunities, professional dive operations and excellent hotels and restaurants. The whole tourism infrastructure has evolved to provide services for the watersports enthusiast—all of which adds up to increased convenience for the traveling diver. Whether you are a novice seeking a first warm water adventure, an underwater photographer hoping to capture some of the world's friendliest fish on film, or an experienced diver anxious to dive the new wrecks of the artificial reef program, the Florida Keys has it all. 🐠



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The pommel of the knife has tiny pecten shells relieved all the way around it. The pakka wood handle is stained a beautiful blue to match the hue of the clear water found in the park. Twin seahorses, indigenous to the keys, are found on the handle guard. The most memorable site in the park has always been the world famous Christ of the Deep Statue. Visited by literally millions of snorklers and scuba divers over the years, the image of the statue is emblazoned on the blade of the knife.

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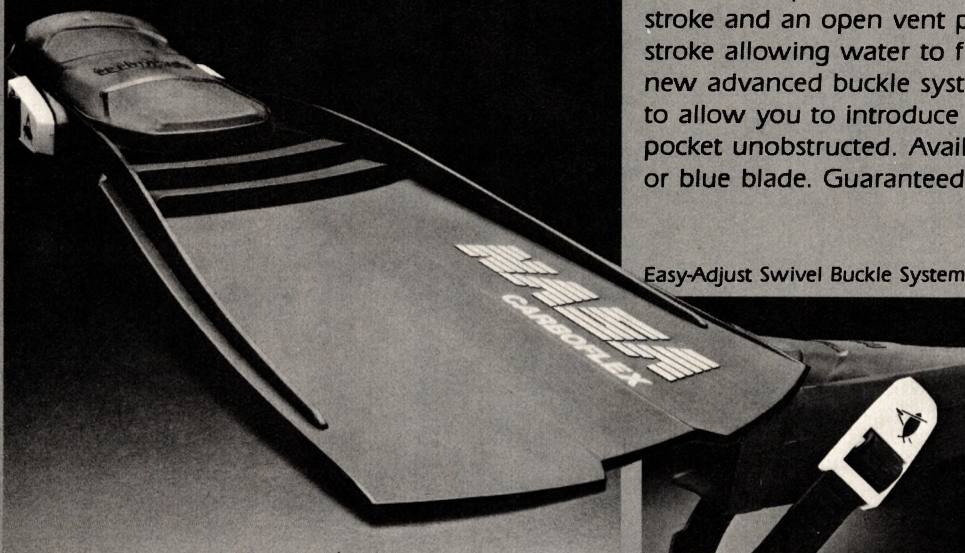
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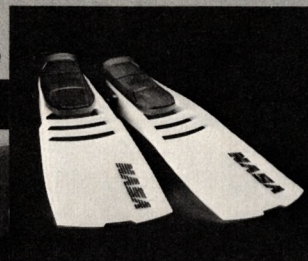


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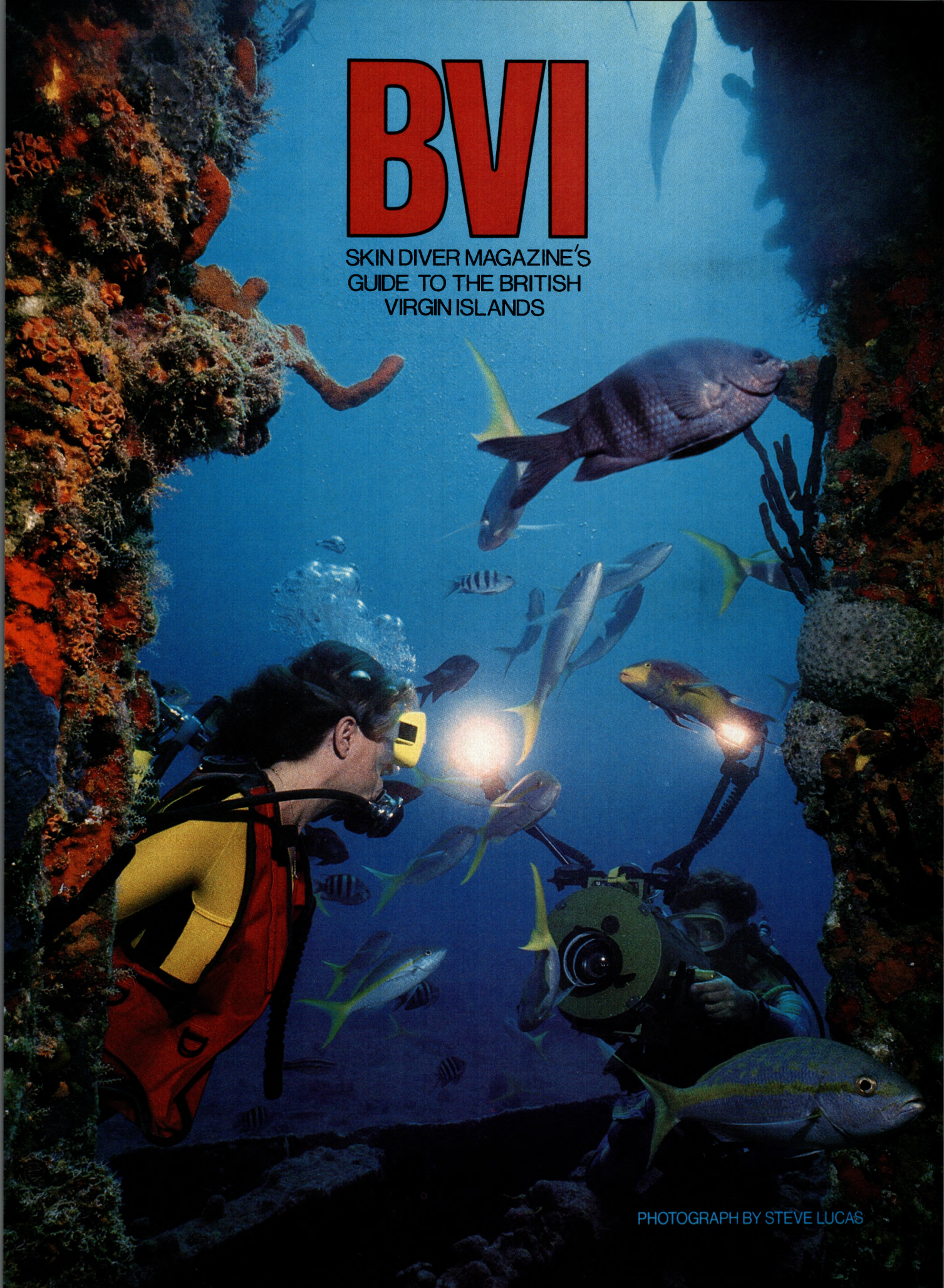
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GUIDE TO THE BRITISH
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PHOTOGRAPH BY STEVE LUCAS



Top: Bigeyes at Blonde Rocks. Above: Road Town Harbour.



A diver handles a friendly filefish.

BVI

STEPPING STONES TO DIVING ADVENTURE

TEXT AND PHOTOGRAPHY BY STEVE LUCAS

There is romance—that, green tropical mountains and multi-colored spinnakers flying from 1,000 sailing yachts. And, of course, there is a multiplicity of secluded coves, some backed by precipitous cliffs with seductive, sandy beaches at their bases. There are stories of pirates—don't forget the pirates—and the ships they plundered. And, there are dozens of wrecks and sunken treasure. There's the strong possibility that somewhere in these islands the seafloor may be carpeted with golden coins!

There are also flowers and fruit; papayas, mangoes and bananas—those luscious tropical delicacies that make waking up in the British Virgin Islands so, well, so invigorating! And, the diving? How could I forget to tell you about the diving? It's colorful. It's fun. It's about as easy as diving gets.

I travel to a lot of places every year. But, I don't know of anywhere else in the Western Hemisphere that has so much to see, or as many different ways to see it, as the BVIs. It really doesn't matter how you like to do it, they have you covered. There are sea-planes, helicopters, sailboats, motor vessels, live-aboard sailing yachts, motor yachts, a diving cruise ship, small hotels, campgrounds, big hotels, expensive hotels, inexpensive hotels, land based dive boats, rendezvous dive boats and other services you and I could never have thought of.

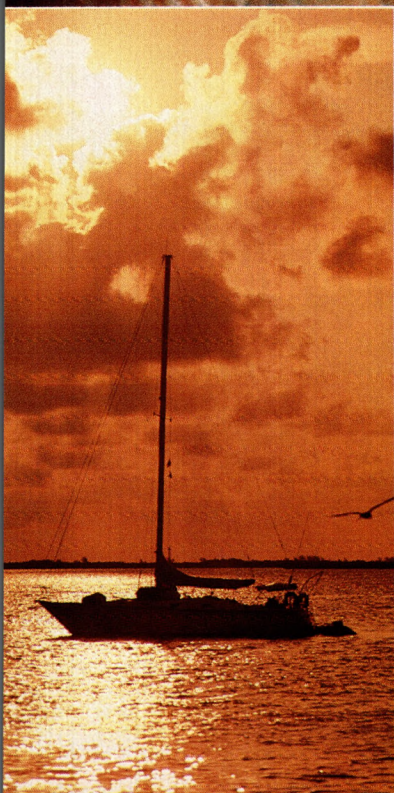
Although you can fly directly into Tortola from anywhere in the U.S. after making connections in San Juan or St. Thomas, you're going to miss something if you do. On at least one leg of your trip you've simply got

to take the ferry. When you arrive on Tortola or Virgin Gorda by fast ferry boat from St. Thomas you get a water level, first glance of Norman, Peter, Salt, Cooper and the other large to medium sized islands that surround Sir Francis Drake Channel. When you see them by the light of a rising sun the urge inside you to explore is simply going to swell. But, so far, you haven't seen anything! You have hardly had a

Fabulous sunsets are common in the BVI.



Yellowtail snappers on the wreck of the *Rhone*.



BVI

glance at the interesting and remote island of Jost Van Dyke, and Anegada is way over the horizon. There are close to 60 other islands, rocks and cays such as Fallen Jerusalem or Dog, or the infamous Dead Chest, immortalized in Robert Louis Stevenson's *Treasure Island*. Legend has it that Blackbeard the pirate abandoned his mutinous crew here.

When you step off the *Bomba Charger* or *Native Son* at Tortola's West End dock (that's what they call two of the ferries that sometimes race each other from Tortola to St. Thomas and back) you know immediately you're going to like this place. The immigration officers sometimes smile and carry on a friendly conversation in their rhythmic, bouncing English while stamping your passport and making sure you know you're welcome.

Once you've made it to the BVIs, whether by plane or ferry, the next major decision will be your method of exploration. Actually, that decision is best undertaken before you come, but if you decide to wait until the last minute you will still find it relatively painless. If counting sails is any indication it would seem the majority have chosen sailboats as their principal means of transportation. Even for divers, the choice is a positive one. If you charter a yacht on your own you will probably be sharing it only with people you already know.

Usually beginning from Road Town, the somewhat less than cosmopolitan BVI capital, or one of the other harbors on Tortola, you can meet your crewed yacht, or sail it yourself if you possess the necessary skills. For most, the choice will be to let someone else do the navigating while you take in the blues and greens of the sea, sky and mountains. There are literally hundreds of yachts from which to choose. According to the best information available, more than 40 have made special arrangements to bring divers aboard for a week or two.

Diving from a sailboat can be a lot of fun and can also eliminate a lot of the noise—compressor noise that is. Although many charter sailing yachts in the BVIs do have one on board for the more hardcore, many others prefer to arrange ahead of time for what is locally called rendezvous diving. By letting the local dive boat operators know which cove you will be anchoring in for the evening, your skipper can arrange for them to pick you up, with all gear furnished, take you to a nearby dive site and return you to your

peaceful surroundings a few hours later. It's not a bad way to combine a sailing and diving vacation.

Another great option, which offers the same basic sailing possibilities with more space and amenities, is to sign aboard one of the larger live-aboard dive yachts such as the catamarans *Misty Law* or *Trespasser*, the world's largest trimaran, the *Lammer Law*, or the *Ppalu*. Each offers varying degrees of luxury and quantities of diving. Some, such as the *Ppalu*, specialize more in sailing with less diving, others such as the *Lammer Law* and her sister vessels try to balance the two so divers will get their fill of nitrogen highs and nondivers will get their fill of everything else.

If you aren't crazy about sailboats, or just want to dive, dive, dive, the motor vessel *Tropic Bird* might be your way to explore. As anyone will quickly tell you, if you want to get in as many as one-half dozen dives a day, the crew of this boat will show you how. They'll probably even be in the water with you most of the time. If you like the water, but prefer a hotel, and still want to get in a lot of diving and island hopping, you can combine the three aboard the world's first dive cruise ship, the 165 foot *Aquanaut Explorer*.

Almost all the vessels make port calls at the same places, although each follows its own particular itinerary. Some, in fact, have no itinerary at all, preferring to let the whims of the trade winds and guests lead them along. Either way, there are certain points along the way you are almost certain to see. But remember, this is a big island group. You're simply not going to see all of it in a one week visit.

A trip to Tortola is really not complete without renting a car and taking off to circumnavigate the island on an exploratory drive. From Road Town head east along the hilly coast toward Beef Island and the airport. Once there, you will find numerous coarse sand beaches. Then take off

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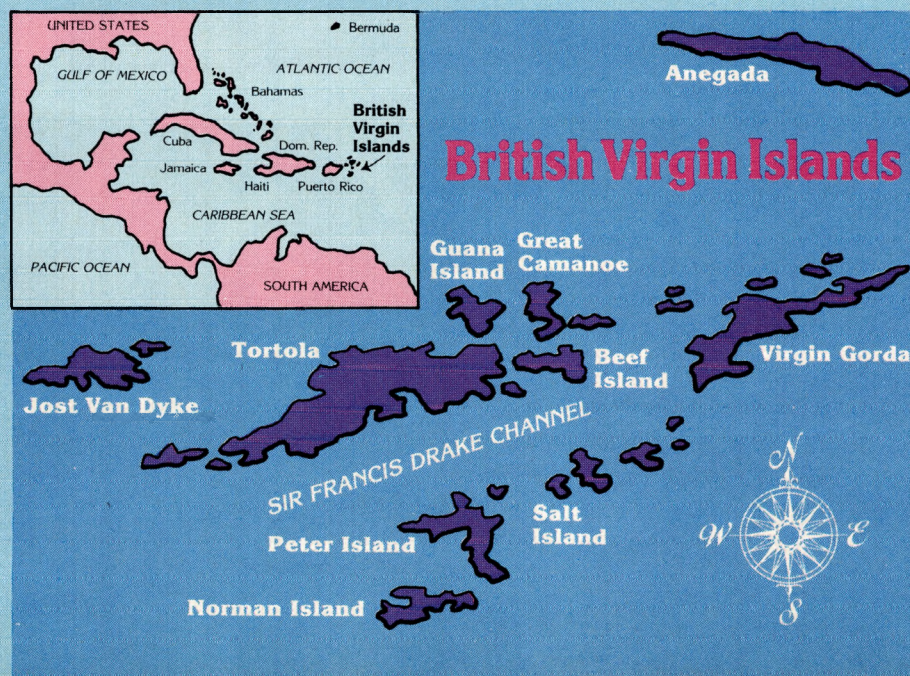
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across the mountain for Josiah's Bay. Giant boulders line its eastern end and breakers often crash on its sand. Josiah's is not easy to find since you'll have to wind down a narrow, unpaved road. But, ask for directions. It's worth the effort.

After Josiah's, make your way west across Tortola's backbone past Brewer's and Cane Garden Bay. Be prepared to look almost straight down some very high cliffs. If you've never seen a beach that has left you breathless, you will, at least from this altitude. Once at Cane Garden Bay be sure and find the Callwood Rum Distillery. In operation for more than 200 years, it is the only one left in the British Virgin Islands. Also, be sure you see Mount Sage and its rain forest along the drive. At 1,780 feet above the sea you will be able to see all the way to St. John in the U.S. Virgin Islands and beyond.

West of Road Town the pavement



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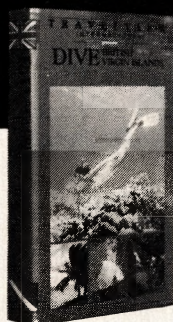


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winds right beside the channel past the Nanny Cay Marina down toward the West End landing. Both Nanny Cay and West End are extremely scenic so be sure to bring a camera. You should plan to do some shopping at the stores in Nanny Cay as well.

Since one of your primary goals is likely to be diving I'd better tell you about that. If you're not booked aboard a yacht or live-aboard boat you'll probably be staying in one of the local hotels. I say "probably" because you could be camping out over at Brewer's Bay. Some of the hotels, such as Prospect Reef, have big pools and amenities such as tennis. Several of the bigger hotels have high quality dive services right at their own marinas. On Tortola you can arrange daily dive trips, or complete hotel/diving packages, at Aquatic Centres/Baskin in the Sun at the Prospect Reef Resort or Treasure Isle Hotel, Blue Water Divers at Nanny Cay Marina, Island Divers at Village Cay Marina, or Underwater Safaris at the Moorings Mariner Inn. Most of them also provide rendezvous services if you elect to charter your own sailboat.

Without question, the hottest dive in the islands is the wreck of the **Rhone**. My feeling about that wreck is that if you kept passing loaded cameras down from the surface I'd just stay down and keep on shooting. There are fish, fish and more fish—plus a lot of coral-colonized pieces of steel wreckage left over from this most famous Caribbean shipwreck.

You may have seen her already and just don't recall her by name. Remember the movie *The Deep*? That was filmed right here on the Royal Mail Ship **Rhone**.

The RMS **Rhone** was a real 19th century tragedy. Early on the morning of October 29, 1867 the 310 foot ocean steamer was at anchor outside the entrance to Great Harbour on Peter Island, not far west of where it now rests. While the ship was being loaded for an Atlantic crossing to Southampton, Captain Robert F. Wolley began to notice his barometer falling. Although the weather was quite tropical at the time, he knew a storm was approaching. Unfortunately, he had no idea of its magnitude. Ordering his anchor lifted he steamed the **Rhone** across the channel to Road Harbour for better protection. At 11:00 am his barometer plunged. One of the fiercest hurricanes of the century was about to crash into the Virgin Islands.

At approximately noon the storm

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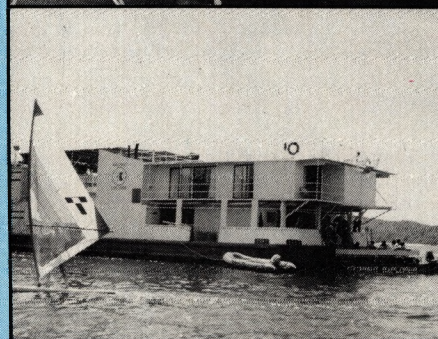
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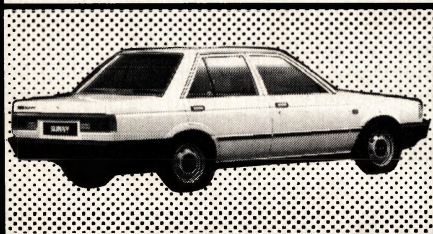
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quieted as the hurricane's eye passed over the *Rhone*. Thinking the storm was finished, Wolley ordered his anchor raised. His 3,000 pound anchor and 300 feet of chain became snagged and fell to the bottom. With no way of holding herself, the ship was forced out into the open sea. With engines running at top speed she steamed seaward, picking her way between Peter and Salt Islands. Just as she came upon the west end of Salt the eye passed and the vicious winds slammed her into Black Rock Point. She split apart immediately, her giant steam boilers exploding as the cool seawater hit their heated exteriors. Spun almost completely around from the direction she was originally heading, her giant propeller came to rest just off the rock with the ship's stern pointing toward the west/southwest. The bow section came to rest, pointing almost due north, forming a slightly compressed L-shape with its aft section. Almost everyone aboard went to the bottom with the ship.

Exploring the wreck takes at least two dives. Normally, the bow section will be dived first. The bowsprit hangs out over the sand in approximately 80 feet of water. The forward section lies on its starboard side. Inside the bow section you get the feeling of swimming in a giant barn with what has been described as "Greek columns" covered in feathery gorgonians and hydroids on one side. The holds are filled with swirling schools of grunts. Sometimes, especially on night dives, a friendly 300 pound jewfish comes out of its hiding place, almost scaring you out of your wetsuit. The forward mast of the ship lies stretched out on the sand with the crow's nest still relatively preserved. A monument declaring the place a sanctuary is at the point where the mast joins the wreck.

On the second dive, exploration of the stern section begins 60 to 70 feet deep. Another set of "Greek columns", actually a part of the deck, stands alone on the sand. Beneath it is a set of giant open end wrenches. Nearby is a coral and sponge covered winch and a pair of boilers. Following the upright stern into shallow water you swim past the engine, the flattened crow's nest of the aft mast and a gear box housing, until you find the exposed prop shaft, which seems to be almost 100 feet long. At one point a school of red squirrelfish often swims beneath the shaft and wreckage. Nearby, a giant featherduster worm has perched itself

atop the wreckage. Farther up the shaft, toward the prop, several portholes can be found on the seaward side of the wreck. The prop itself is gigantic and shows the scars of having been smashed against Black Rock Point on that stormy October noon 120 years ago. Nearby is **Rhone Reef**, where two coral caves are found in less than 25 feet of water. A large variety of corals can be found on the site, which shares protective status with the wreck.

There are two basic types of reefs near Tortola, and throughout the BVIs for that matter. Some, such as **Rudder Rock**, are colorful coral formations covered with seafans and gorgonians that cascade from the adjacent island into deeper water. Others, such as **Painted Walls**, look as if the Jolly Green Giant carved out an overly large set of toy building blocks for his kid and scattered them over the bottom. To decorate them for junior, nature has given most of them a liberal coating of sponges and other colorful growths as well as a nice supply of tropical fish.

Don't expect to find dramatic walls or drop-offs throughout the British Virgins. If that's all you're looking for, you will be quickly disappointed. The average depth of most reefs will be less than 50 feet with many as shallow as 10 to 30. An 80 foot dive is a deep one down here. Instead of drop-offs and depths, prepare yourself for color, especially if you dive with a flashlight or video light. Also, prepare yourself for some fire coral. A light, full wetsuit, protective Lycra suit, or even jeans will do the trick. But, wear something to keep yourself from suffering the consequences of contact with the coral.

Some sites, such as **Blonde Rocks**, actually receive their names from the pale yellow color of the fire corals that cover everything. But, as long as you don't rub against them, you have little to be concerned about. What you will find most enjoyable about this site is its small caves filled with copper sweepers. There is also an occasional lobster as well as several overhangs that house large, undulating schools of grunts along with a contingent of French and gray angels.

Painted Walls is actually a series of long surge canyons, some with small caves, that drop away from a rough island. The reef gets its name from the colorful encrustations that cling to the giant block walls. They look as if they were painted on by some mad artist. At the end of some of the channels you can find a small cave or two. At the entrances to almost all of the cuts you can examine very large cathedral spires of delicate, feathery pillar corals.

The Indians are four very large rocks that jump right off the ocean floor, rising more than 90 feet out of the water. The seafloor around the pinnacles is relatively shallow, making exploration easy. There are lots of corals—including pillar corals and seafans—all around the base with its principal feature being a cave with two

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BVI

entrances virtually filled with silvery copper sweepers.

Great Harbour, on the north side of Peter Island, lies across the channel from Road Town; in the center is a shallow coral reef barely 50 to 60 feet from shore. As are almost all the BVI reefs, the place is filled with colorful sponges, small corals and darting fish. Sloping gradually from a depth of less than 10 to just under 20 feet, it suddenly drops vertically to about 40.

Nearer Virgin Gorda, Great Dog is a popular sailor's anchorage. A shallow reef runs all along the lee side of the island. It is filled with tiny subjects perfect for a close-up lens or macro camera attachment. One of the island's best known sites is the **Chimney**. With a depth of just more than 40 feet, its fish are very tame and easily handled or photographed.

On nearby Cockroach, the **Invisibles**

has several big rocks that jump from depths of 70 to less than five feet beneath the surface. The bottom is decorated with more of the giant stone blocks common in the BVIs. It is a popular place for finding lobster and photographing nurse sharks. If you crawl under the overhangs you'll find them filled with bigeyes and sweepers. For some reason, the butterflyfish seem always to be schooling at this point. Although you normally see these colorful little fish only in pairs in most of the Caribbean, it is not unusual to find a dozen or more roaming the corals together searching for food.

Anegada Reef, well off to the north of the main island group, is really comprised of dozens, perhaps hundreds, of dive sites. Since the 1500s it has claimed more than 300 ships. Almost anywhere you dive you'll find the remains of a wreck in the form of ballast stones or other odd shaped pieces of iron covered with coral.

One of the most exciting wrecks in the area is the **Chikuzen**. A 246 foot refrigerator ship, it lies in 75 feet of water between Virgin Gorda and Anegada. Sunk in 1981, it is somewhat intact and is covered—I repeat, covered—with fish. Everything from schools of jacks to manta rays to jewfish to barracudas and sharks has been seen by divers at this spot. Horse-eye jacks are especially common, as are hordes of giant southern stingrays. If you are bringing an underwater video camera on your vacation (if not, then rent one when you get here!), this is one place where you can really burn up some tape.

Throughout the island chain there are many other popular dive spots such as **Dead Chest**, **Ring-Dove Rock**, **Seal Dogs** and **Alice in Wonderland**. In fact, there are more than 200 named sites!

By comparison to Virgin Gorda, the island of Tortola really is cosmopolitan. Virgin Gorda is one of those "Fantasy Island" kind of places. Hotels such as Little Dix Bay, built by Lawrence Rockefeller, offer you a high scale of service on a tropical mountain-surrounded lagoon complete with coconut palms. The island also has a lot of things to see, so even if you are staying on Tortola, plan to catch the ferry and come over for a day.

Columbus is credited as having said Virgin Gorda's rolling topography reminded him of an obese woman lying on her back. It was once the capital of the BVIs and Spanish settlers came here in the 16th century to mine copper. One of the most popular reasons for coming here today is to see the Baths.

Near the southwest tip of the island, they are comprised of an unusual grouping of large granite boulders that seem to have been rolled one atop the other. Where the ocean has washed away the sand between the giants, large pools—or baths—have been created. The light plays lots of tricks at this place, creating one of the most often photographed and fascinating locations in this part of the

Caribbean. From the shore, the place is truly photogenic since there is almost always an entire fleet of sailboats just offshore. It is one of the most popular anchorages in the Virgins.

Adjacent to the Baths is Spring Bay Beach. It has more of the same large boulders, one of which is called Aphrodite's Throne. This is a great place to come and play when you need to get some of the nitrogen out of your system. Three more popular beaches are also available on the island, if you have the transportation to find them: Savana Bay, Bercher's Bay and Deep Bay on the North Sound. According to the official BVI tourist guide, Deep Bay is considered one of the best for "serene seclusion."

Land based diving on Virgin Gorda is provided by Dive BVI at the Virgin Gorda Yacht Harbour or by Kilbrides Underwater Tours at Saba Rock. Like their counterparts on Tortola, either can arrange a complete dive/hotel package or rendezvous with you if you are on a privately chartered yacht.

There are several other islands in the chain that deserve to be visited, but you will have to do so by yacht or live-aboard dive boat. Jost Van Dyke is quite mountainous and becomes visible from the water as soon as you sail into Pillsbury Sound coming from St. Thomas in the U.S. Virgin Islands. Named for a Dutch pirate, the total island population is barely 200 persons. It is large, still unspoiled and the locals plan to keep it that way.

The one major island that does not have mountains is Anegada. Well north of the remainder of the island group, its highest point above sea level is only 28 feet. Fringed with miles and miles of sandy beaches, it is best known for the dangerous reefs that have claimed more wrecks than, perhaps, any other in this part of the Caribbean. With only one hotel and dive operator, Anegada Reefs Hotel Dive Shop, the choice of lodging if you elect to spend a week or two exploring her coral and wrecks, is obvious.

So, if you think you could stand some time in the islands, those with a little romance that are green with tropical mountains and decorated by silky multi-colored spinnakers flying from 1,000 sailing yachts, then you just have to call for a plane reservation to the British Virgin Islands right now. Pan Am and other airlines can get you as far as St. Thomas, and then the ferry, a seaplane or direct flight to Tortola will do the rest.

While you're there don't forget to explore some of the "multiplicity of secluded coves backed by precipitous cliffs with seductively sandy beaches at their bases." Or, read a few of the stories of Blackbeard and sunken treasure while looking at Dead Chest. Or, just smell the flowers—or taste the fruit—or do a little diving for that matter. Here I go again. There's just so much to tell you that if I get started I won't be able to stop. Go see it for yourself. 

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Photo Credit: Frank T. Shane



Captain Mike Bloss, M/V Tropic Bird

Hi,

I'm Mike and this is my boat. I'm really proud of her. 110 feet on deck and air-conditioned comfort below. There is lots of play space and room for your dive gear. We serve you three really good meals each day, prepared by our experienced galley crew. (You don't have to live off the fish you shoot, in fact we don't let you shoot fish; leave them for the next guy to see. Take their pictures, not their lives.) Buffet dinner is accompanied by wine, conversation with my crew of dive masters and instructors, tall tales by me, and laughter by you-all. TV movies and games are available if you can stay awake after a day of diving.

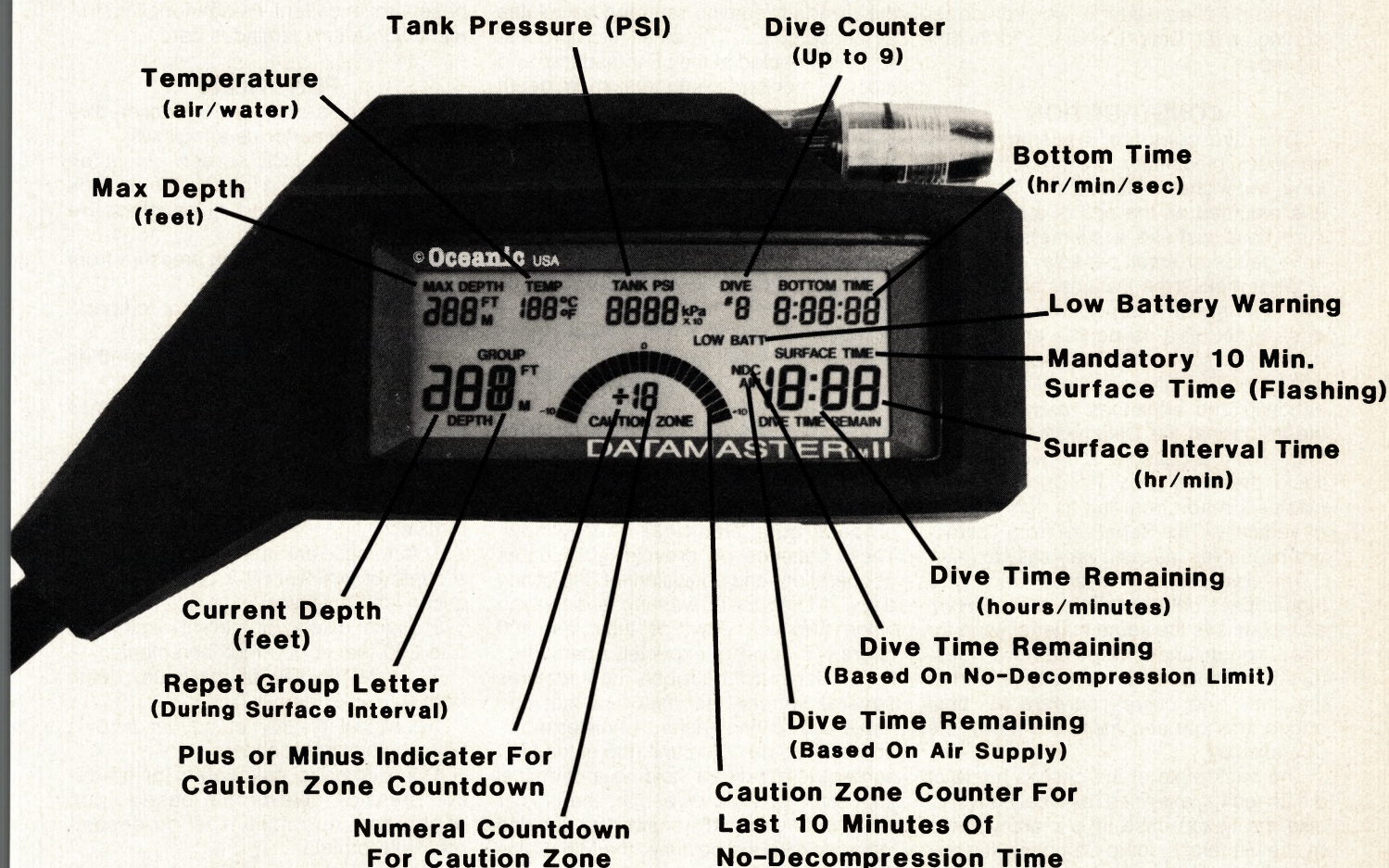
Now that you know what to count on on the surface let me tell you about the important part of the trip—DIVING. We have done our first dive and had breakfast before most other boats have reached their dive sites—you are living over your dive. There is no waiting on the dock, no lugging heavy gear, no sandy beach entries and exits. The BIRD's huge dive platform makes in and out easy, as easy as getting out of bed, putting on your gear, and stepping over the side. We feature clear, warm water; plenty of colorful fish, and so many dive sites it's hard to keep track of them. Unlimited diving to me means diving 'til the tables tell you to stop; there is no "12 dives plus one night dive" limit on my boat. I'll guarantee you can dive every day. Go for it!

How many captains have you been diving with? I go on EVERY dive, unless you have run me out of bottom time. Try me—I LIKE TO DIVE.

We give you what other dive operations only offer—all you have ever dreamed of in a dive vacation. Our groups keep coming back to TROPIC BIRD again and again. If you haven't met us yet, come on down; you-all who know us "Let's get wet AGAIN!"

Once you have been here you'll occasionally get a letter in the mail like this one to tell you what we have been doing lately and to say hi. The difference will be 1) my typing 2) someone edited this, correcting my spelling and grammar. (I hope he didn't miss too much!) You won't miss anything on TROPIC BIRD (just us after you have gone home).

Don't miss diving with us!!



The Datamaster II is the first of a new wave of pressure integrated diving computers from Oceanic USA. This instrument attaches to the scuba regulator and monitors tank pressure, rate of air consumption and remaining air supply.

The Datamaster II is different from its contemporaries in many ways. It is a dedicated no-decompression computer that doesn't encourage—in fact discourages—decompression dives. Its no-decompression formula conforms to the U.S. Navy no-decompression limits, yet incorporates multi-level dive times. And, it is the first computer to provide the user with a repetitive dive group letter.

In other words, the Datamaster II is so radically different from other dive computers it is impossible to make a direct comparison. And, it performs some amazing calculations that can help keep a diver from running out of air.

DEVELOPMENT

The Datamaster is the result of one of the most extraordinary development projects in the history of the diving industry. For the first time, two major diving equipment manufacturers pooled their resources to pioneer a revolutionary prod-

Datamaster II

TEXT AND PHOTOGRAPHY BY GERI MURPHY

uct concept. Oceanic USA and U.S. Divers Company were co-developers in this \$1.5 million research project.

The actual development and production of the dive computer was carried out by Pelagic Pressure Systems of San Leandro, California. The logic for the computer program is based on formulas developed by Dr. John Lewis, a physicist and director of a Southern California research firm. The tables have been calculated on six tissues with half-times ranging from 5 to 120 minutes.

The fruits of this co-sponsored Oceanic/U.S. Divers program are actually two separate dive computers. Oceanic will be distributing the Datamaster II, while U.S. Divers will be offering the Data Scan II. While the basic logic of these two computers is similar, there are a number of

**OCEANIC'S NO-
DECOMPRESSION
COMPUTER THAT
MONITORS AIR
CONSUMPTION
AS WELL**

differences in functions and liquid crystal displays. This report is devoted specifically to the Datamaster II; we shall be reporting on the Data Scan II in a forthcoming issue.

CONSTRUCTION

The dive computer housing is very compact, measuring roughly 4.5 inches long, two inches wide and one inch thick. It is mounted on the end of a high pressure hose just like a submersible pressure gauge or small console.

What makes the Datamaster II distinctive is its stylish exterior. The instrument case is set on a 40 degree angle to the hose axis, somewhat like the head of a golf club. This offset angle allows easier handling and enhances readability. But the tip-off that the Datamaster II is more than a just a console is its wide screen liquid crystal display (LCD). The Datamaster II reads from left to right instead of vertically. This departure from "standard" consoles makes it very easy to read.

The dive computer case is made of a high-impact polycarbonate resin known as Lexan. It is the same material used for see-through underwater camera housings. The molded front window is part of the case and curves outward for both added strength and magnification of the LCD display.

The back plate of the case is made of a high tech, glass-filled resin called Noryl. Like the Lexan case, it is manufactured by the General Electric Company. It is extremely tough and resists bending and flexing under pressure. The back plate is held in place by eight stainless steel screws, sealed in place to prevent unauthorized tampering.

A thick rubberized boot surrounds the computer housing, protecting it from bumps, scratches and rough handling. Under the boot an ingenious plastic cover with angled holes protects the low pressure transducer (depth sensor) membrane from punctures or dents.

The Datamaster II has two pressure transducers—highly sensitive instruments that convert pressure to electric current. One is a high pressure device that reads tank pressure via the high pressure hose. The other is a low pressure device for precisely measuring depth.

The transducers are, in turn, connected to a very special four channel A-to-D microchip that converts analog electric impulses into digital data; the language computers use. The HP and LP transducers occupy two of the channels, the remaining channels are used for an electronic clock, a temperature gauge and other data.

The Datamaster II has four microprocessors, two of which are known as "drivers." These latter are what make the numbers and graphic images appear on the LCD screen. The other two microprocessors are the "thinkers" of the system.

One is connected to the HP transducer and clock. It gauges tank pressure, times the diver's breathing rate and calculates air consumption. The other microprocessor is connected to the LP transducer and clock. It monitors depth, maximum depth and bottom time and compares this data to the dive tables. From this comparison, it calculates remaining dive time.

The fascinating aspect of the Datamaster II is that the two microprocessors are linked. The remaining dive time displayed is based on either remaining air supply or the no-decompression limits, whichever allows the least time. This computer is really smart—it can make some very intelligent choices.

The entire Datamaster II system of transducers, microprocessors and LCD screen is powered by two small, three volt batteries. These are not ordinary lithium batteries, but instead special military approved ones that deliver a much better ampere/hour electrical energy flow. These batteries will provide 6,000 hours of operation—the equivalent of 300 diving days. A LOW BATT warning is displayed when they are down to their last 900 hours (45 days) of expected operation.

The Datamaster's rubber boot features several optional accessories that can make your diving easier. A holster molded into the side of the unit (top of the LCD screen) is handy for holding a chemical light stick for night dives. Or, the holster will accept Oceanic's answer for peeking into cracks in the daytime, the Mini-Hylite flashlight. Either type of light source enables you to illuminate the LCD screen without using your dive light.

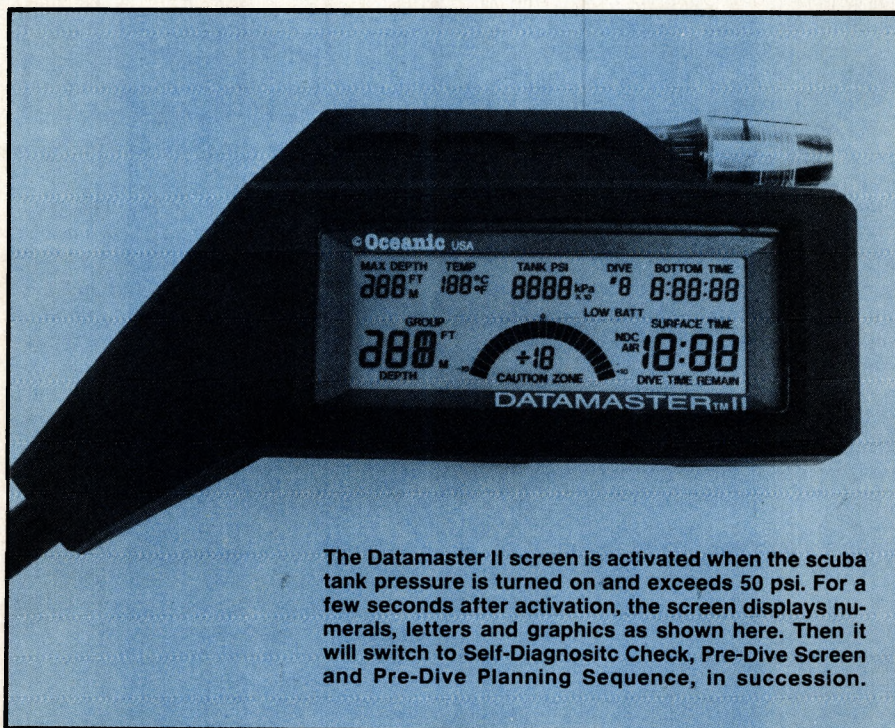
The back of the rubber boot contains a slate on which an ordinary pencil can be

used to jot down messages. It can be replaced with the Oceanic SlimLine compass—an excellent navigational instrument with a fully luminous card.

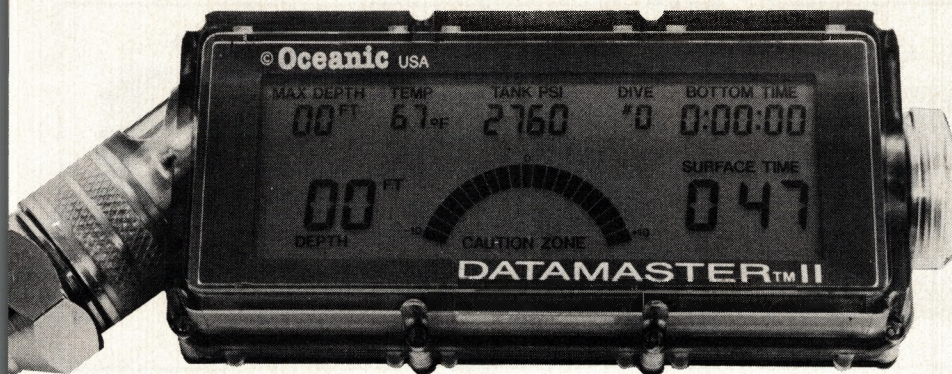
FUNCTIONS

The Datamaster II is a 23 function dive computer that performs as follows:

- 1) Automatic LCD screen activation and self-diagnostic check when tank valve is opened and hose pressure reaches 50 psi.
- 2) Digital display of tank pressure from 0 to 4,500 psi.
- 3) Digital display of ambient temperature (air or water) from 32 to 122°F.
- 4) Dive counter from 0 to 9 dives (then reset to 0).
- 5) LOW BATT warning when batteries are down to a 15 percent power reserve.
- 6) Pre-Dive Planning Sequence (PDPS) of air consumption and no-decompression limits (30 to 130 feet) prior to dive.
- 7) Automatic activation of dive timers at a depth of five feet by a pressure transducer (depth sensor).
- 8) Digital display of current depth from 0 to 250 feet in one foot increments.
- 9) Digital display of maximum depth from 0 to 250 feet.
- 10) Digital display of bottom time in hours/minutes/seconds.
- 11) Automatic calculation of no-decompression dive profile based upon depth, time and multi-level no-decompression formula.
- 12) Automatic calculation of air supply remaining based on the current breathing rate of the user.
- 13) Digital display of dive time remaining based on air supply remaining or no-



The Datamaster II screen is activated when the scuba tank pressure is turned on and exceeds 50 psi. For a few seconds after activation, the screen displays numerals, letters and graphics as shown here. Then it will switch to Self-Diagnostic Check, Pre-Dive Screen and Pre-Dive Planning Sequence, in succession.



This is how the Datamaster II looks with its protective rubber boot removed. The clear plastic case is molded from Lexan resin. Note the hose attachment.

COMPARISON OF NO-DECOMPRESSION LIMITS

DEPTH (feet)	U.S. NAVY (minutes)	DATAMASTER II (minutes)	DATAMASTER II (with Caution Zone)	EDGE (minutes)
30	NL	220	215	234*
35	310	160	155	NDD
40	200	120	115	136
50	100	70	65	77
60	60	50	45	53
70	50	40	35	40
80	40	30	25	31
90	30	25	20	24
100	25	20	15	19
110	20	15	10	13
120	15	10	5	11
130	10	5	0	9
140	10	0	0	7
150	5	0	0	7
160	5	0	0	6
170	5	0	0	5
180	5	0	0	**

NDD = Next Deeper Depth

NL = No Limit

* = Certain times will vary slightly according to conditions

** = The EDGE cannot be used below 170 feet

decompression time remaining—which ever allows the least time.

14) Graphic/digital display of the Caution Zone based on the last ten minutes of dive time remaining. It will call out the times in one minute intervals from +10 to 0 and then count overtime (decompression) each minute from 0 to -10.

15) Low tank pressure warning (flashing display) when there is less than 500 psi of air in the scuba cylinder.

16) Digital display of surface interval.

17) Digital display of repetitive dive group letter.

18) Warning (flashing display) of minimum ten minute surface interval.

19) Automatic calculation and scrolling of repetitive air dive time remaining or no-decompression limits based upon surface interval.

20) Automatic calculation of emergency decompression stop at ten feet if diver error is made.

21) Automatic shutdown of Pre-Dive Planning Sequence, Caution Zone and Dive Time Remaining if a no-decompression dive violation has been made. These functions remain shutdown for 12 hours after the last dive.

22) Automatic altitude adjustment during initial activation, zeroing out the depth gauge to ambient atmospheric pressure. No-decompression and Caution Zone calculations will not display at altitude.

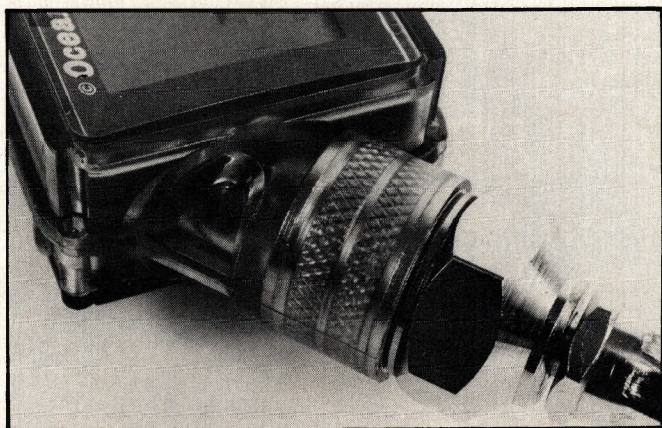
23) Low air supply prediction of when diver must begin ascent (at 60 feet per minute) to reach the surface with 300 psi in reserve.

OPERATION

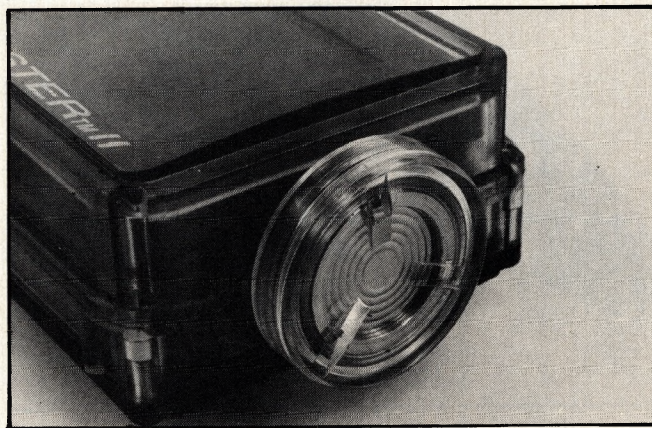
Operation of the Datamaster II is fairly simple and straight-forward, but you should first read the instruction booklet. It will help you to understand the information shown on the computer and avoid a possible dive violation.

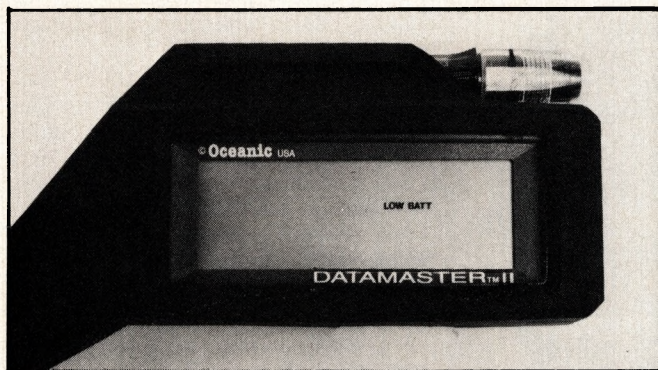
Installation: In order to operate, the Datamaster II must first be installed on a

The computer's high pressure transducer is at the end of the hose. It monitors tank pressure and the diver's air consumption.



The Datamaster II's low pressure transducer is at the opposite end of the case. It continually monitors the diver's depth.





The Datamaster II screen displays the LOW BATT signal as it completes its self-diagnostic check of all computer circuits.

scuba regulator. Its hose is screwed into the high pressure (HP) port of the first stage, just like the hose of a submersible pressure gauge. This hose must be positioned over or under the diver's left arm for proper viewing of the LCD screen.

Sleep Mode: At the time of manufacture the Datamaster II is switched on and given a permanent birth date (Greenwich Mean Time). From that date forward, the computer circuitry is always on. Its clock is running as it slumbers in a low energy Sleep Mode. The computer can sit on a shelf for three years and still have enough energy to operate, once activated.

Screen Activation: The Datamaster II has no external switches or control knobs. Everything is done automatically. The LCD screen is activated by connecting the scuba regulator to the tank and opening the tank valve. It takes 50 psi to switch on the LCD display.

The first display is very impressive—similar to turning on the lights of a Christmas tree. The screen lights with a series of numerals, letters and graphics. They indicate the entire range of data the computer can display. This presentation lasts for a few seconds.

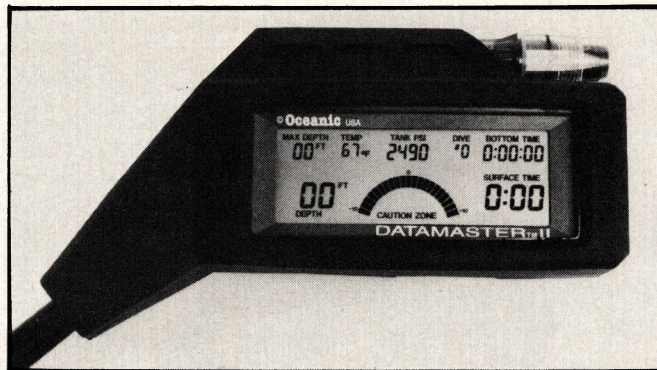
Self-Diagnostic Check: The next display is pretty much a blank screen with just the phrase LOW BATT. Don't panic—the computer is not telling you the batteries are going dead. Instead, the Data-

master II is running a check of its own circuits. If there is anything wrong, the computer will tell you by presenting a flashing display. The LOW BATT display remains on for only three seconds.

Pre-Dive Screen: The third display shows mostly zeros with the exception of the temperature and the tank pressure (psi). This display indicates the Datamaster II is ready for diving. This display will remain on the screen for 15 seconds before switching to the Pre-Dive Planning Sequence. From then on, the two displays will alternate until a dive is started. As time goes by, the Pre-Dive Screen will record the accruing surface time, thus indicating how long the Datamaster II has been switched on.

Pre-Dive Planning Sequence: Once the computer switches into the Pre-Dive Planning Sequence, the LCD screen will begin to display depths and times. These are the diver's allowable bottom times based upon his/her personalized breathing rate or no-decompression limits, whichever allows the least time.

Beginning with 30 feet, the screen will display depths in 10 foot increments and show the corresponding bottom time limit. Each depth is displayed for three seconds. In computer circles, this type of sequential display is known as scrolling. When the computer reaches the display for 130 feet, it switches back to the Pre-



The computer's screen displays all zeros (except for pressure and temperature) when it has reached Pre-Dive mode.

Dive screen for a 15 second rest. Then, it starts scrolling the Pre-Dive Planning Sequence again.

There is one tricky little aspect of the Pre-Dive Planning Sequence about which you must be aware. Be sure the scuba tank valve is fully open and the TANK PSI is reading 2,200 to 3,000 psi. If the tank valve is shut or the tank pressure is low (such as 1,100 psi), the Pre-Dive Planning Sequence will scroll bottom time limits based on the limited air supply rather than the no-decompression tables.

Dive Screen: Once the diver enters the water and descends to five feet, the computer switches to the Dive Screen. Now the LCD screen is filled with data.

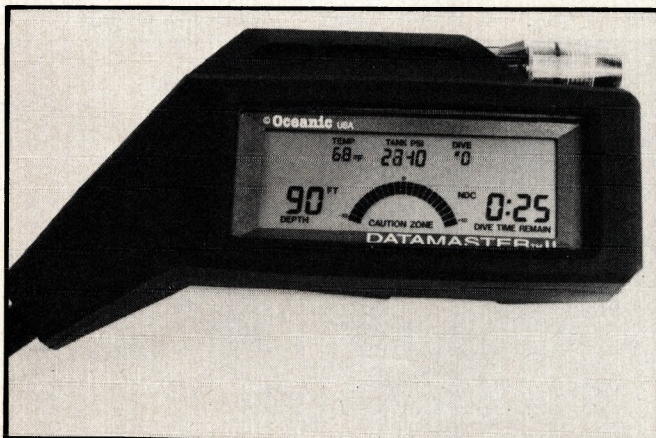
Reading from left to right, the top row of displays provide: the maximum depth reached, water temperature, tank pressure, dive number (#1 for the first dive) and bottom time (in hours/minutes/seconds). The two large displays in the bottom row indicate the current depth and the dive time remaining.

Dive Time Remaining: The key display on the Dive Screen is the Dive Time Remaining, in the lower right hand corner. It exhibits time in hours/minutes. This is the display you keep an eye on during the entire dive, because it tells you when to start your ascent.

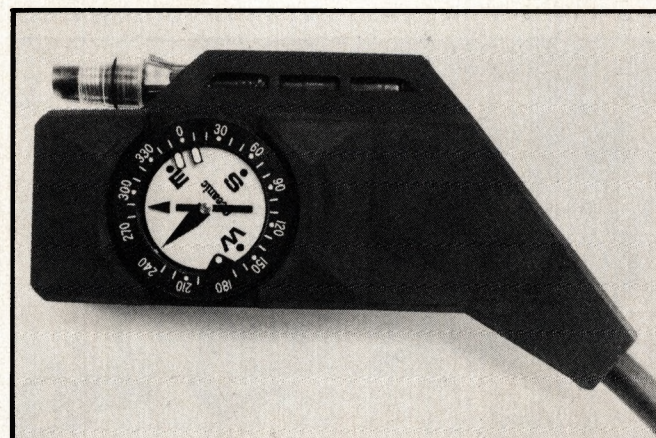
As depth and/or bottom time in-

(Continued on Page 137)

In the Pre-Dive Planning Sequence, the computer displays no-decompression time limits on an automatic, scrolling cycle.



The back of the Datamaster II's rubber boot will accept Oceanic's Sidescan compass. A small light can be fitted into the top.



TRAVEL

A major effort has been launched to introduce Fiji's remarkable diving frontier to the American market. Special low air fares, coupled with hotel and dive packages, present South Pacific diving at Caribbean prices. Continental Pacific Vacations has teamed up with several hotels, resorts, dive shops and the largest travel agency in Fiji to make this incredible offer. Air fare is \$595 from the West Coast and hotel/dive packages start as low as \$579 per week. This month SKIN DIVER visits the Hyatt Regency and Sea Sports, Fiji.

All flights transit through Honolulu, then there is a six hour flight aboard a Continental Airlines DC-10 to Nadi (pronounced Nan-dee). Clearance through Fijian customs and immigration is relatively fast and painless. Current passports are required and a \$10 per person departure tax is levied. From immigration it is a short walk through the terminal to Tapa Tours (a division of Travel Company, Ltd.). To facilitate transit and transfers, travelers pick up their packets with hotel and diving vouchers, a typed itinerary of the trip's schedule and confirmations for return flights are made.

It is a two hour shoreline drive, aboard a 24 passenger bus, to the Hyatt Regency, Fiji. The countryside is beautiful, mountainous (volcanic in origin), plush and green with tropical foliage and cane fields. Year-round temperatures of 75 to 79°F necessitate light clothing and sun protection.

Known as some of the most friendly and hospitable, people are Fiji's greatest asset. Waves, smiles, handshakes and *bula* greet visitors with an all encompassing welcome similar to Hawaii's *aloha*. Unspoiled by Western influence, the Fijians have held onto their heritage. Communal villages remain small and resorts decorously reflect Fijian culture. Once a British colony, the country's official language is English. Currency is based on the



FIJI HYATT REGENCY An Affordable South Pacific Paradise

TEXT AND PHOTOGRAPHY
BY ROD AND KATHY CANHAM

decimal system and the exchange rate is almost the same as the American dollar. Tipping is neither customary nor expected.

On the famed Coral Coast midway between Nadi and the capital city Suva, the Hyatt Regency combines its reputation as one of the world's leading hotel chains with a progressive, sports oriented management. Built in 1979, the hotel has 249 rooms, 10 suites, three restaurants, a large pool and long white sandy beach spread over 28 neatly manicured acres. Tastefully decorated, each room has a queen sized bed, refrigerator, piped-in music and balcony. Electricity is 230 volt 50 cycle AC. A special converter is needed to charge or use appliances built to use 110 volt 60 cycle currents.



Left: Wicked Walu restaurant (background). Above: The 249 rooms and 28 neatly manicured acres of the Hyatt Regency, Fiji. Below: Poolside bar.



The Hyatt recently opened a sports complex. Club Olympus has squash and tennis courts, a weight room, pro shop and health food snack bar.

The hotel is managed by Giovanni Ronghi. His priority is making guests feel welcome. "We try to make people feel as if they are at home and not just another number. People get to know our staff and we encourage guests to take a taste of the Fijian culture," he told me.

One such "taste" is offered twice weekly. A tribe of fire walkers, in native garb, dance and chant around a mound of stones that have been heated on a burning pyre for the previous five hours. Their leader commands "Vuto-o" and painlessly they walk, stand, sit and lie down on these hot stones—to the exhilaration of the hotel's guests.

Sea Sports, Fiji is the dive operation in a beachfront office at the Hyatt.

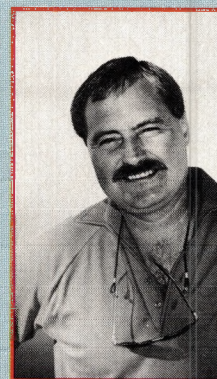
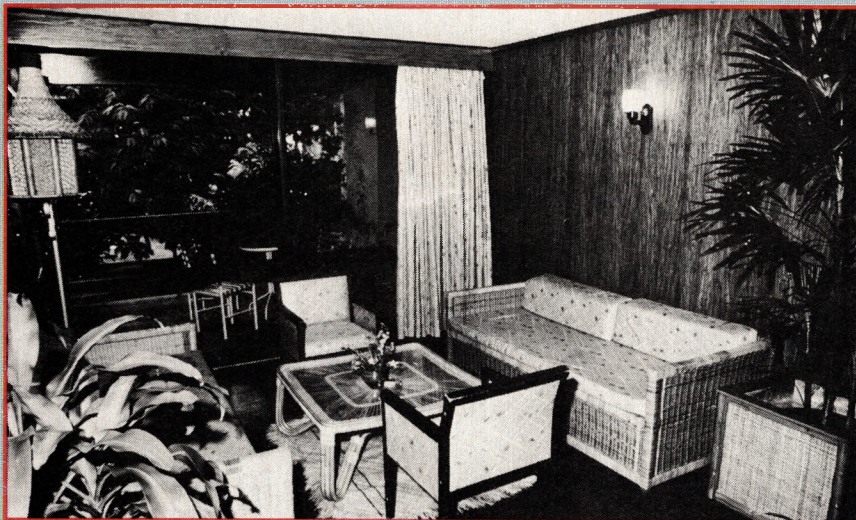
TRAVEL

Owner Denis Beckmann is a former Australian who came to Fiji four years ago after completing a PADI Instructor Training Course in San Diego. During his three day return stopover on Fiji, he fell in love with the islands and never left. The key words to Denis' dive operation are flexibility and service. Catering to new and intermediate level divers, his staff and boats can handle groups of up to 30. Close supervision is the norm with a one to four guide to diver ratio. Sea Sports offers three one tank dives daily as well as night dives. Tanks of 80 or 88 cubic feet capacity are filled to 3,000 psi. The staff cleans, stores and readies all dive gear daily, providing a laid back pace for the Fiji vacationer.

The coastline in front of the hotel is locked in by a barrier reef running 500 yards parallel to shore, necessitating a two to three minute van ride to the small open boats. From there it is a 5 to 15 minute boat ride to the dive sites. Short trips are ideal as afternoon winds can pick up on this side of Fiji. All dives are conducted as drift dives with boat retrieval at the point of surfacing. Surge is present to some degree and visibility can range from 60 to 120 feet with an average of 80. Water temperatures range in the low to mid 80s(°F), so thermal wear is not necessary but protection from the coral is.

Once below, it is understandable why Fiji has been such a popular draw to Australian divers the past 25 years. The slight, ever-present current provides a constant influx of nutrients. Corals are large and healthy, presenting a microcosm of diverse, colorful marine life. At initial glance, schools of chromis sweep the tops of plush corals while closer inspection reveals a world of invertebrates, anemones and territorial tropicals. Names such as Regency Reef, Morgan's Refuge and The Great Wall differentiate areas, yet the similarity and richness of the offerings are remarkable. Two of our favorite sites are named after Bruce and Anita Bassett and their organization, Human Underwater Biology.

Descending along a gradual slope brings divers to a sheer drop from 10 to 90 feet. HUB's Discovery is a wall covered with pastel pink, lavender and beige *Alcyonacean* soft corals, gorgonians and black coral trees. The serenity of the site is tranquillizing. Schooling barracudas pass by and a



Top: Interior of a Hyatt Regency suite—complete with tropical decor. Above left: A diver takes a close look at an anemone clownfish and its host. Mid right: Giovanni Ronghi (left), general manager of the Hyatt Regency, Fiji; Denis Beckmann, owner of Sea Sports, Fiji. Above right: Close-up of anemone clownfish.

community of three different species of lionfish permanently inhabits the area. The wall is capped with diverse hard corals alive with schools of brightly colored tropicals. The site could be dived repeatedly, yielding new discoveries and displaying different personalities each time.

Anita's Delight is an ideal second dive site. The flat reef starts at 20 feet and gently slopes to more than 50. It is a maze of ledges, cuts and overhangs rich with gorgonians, anemones and tropicals. Fire gobies play hide-and-seek with macro photographers, seashells are present and spot-

ted eagle rays are frequently sighted. The beauty and diversity of the reef leaves us eager for more.

It is not often paradise is offered at such great savings to prospective travelers. Ideal for individuals, families or groups, Fiji is a top quality destination at an affordable price. For more information about Fiji, its hotels, dive operations and booking information, call Continental Pacific Vacations toll free at (800) 525-2560 (U.S.); (800) 252-2560 (in California); (800) 225-4834 (in Canada). You can write to 10351 Santa Monica Blvd., Suite 309, West Los Angeles, CA 90025. >

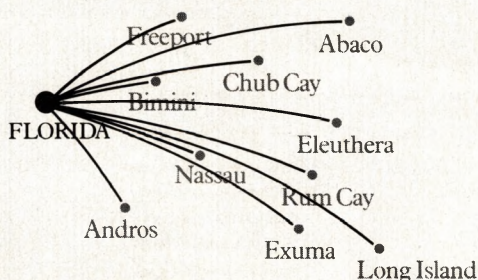
The Bahamas.

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CIWOA OFFICERS

Ronald Kipp, owner and operator of Bob Soto's Diving Ltd., was recently elected the 1987 president of the Cayman Islands Watersports Operators Association. Other new officers include David Feinberg, general manager of Tiara Beach Hotel, treasurer and Urs Billiter, owner and manager of Divers World Ltd. of Cayman, secretary.

The association, formed in 1980, has 29 members who are competing watersports operators. It works to promote the safety of divers visiting Cayman. Each member makes a financial or time commitment to the operation of the island's recompression chamber. And, almost every operation has an employee who is a chamber operator or tender.

The association plans to continue its emphasis on reef preservation through its support of both the National parks and dive boat mooring programs.



The members of the executive committee include Kipp, Feinberg and Billiter as well as Kathie Kipp, administrative assistant (non-voting); Kelly Cook, from the Cayman Department of Tourism, (non-voting); Adrien Briggs; Jil Foster; and Martin Sutton.

The chairmen of the standing committees are Adrien Briggs, government liaison; Jil Foster, marketing; Lori Cutler, trade shows; Martin Sutton, FAM trips; Ed Uditis, DEMA; Peter Milburn, conservation; Alan Whitfield, permanent moorings; and Patricia Scharr, safety.

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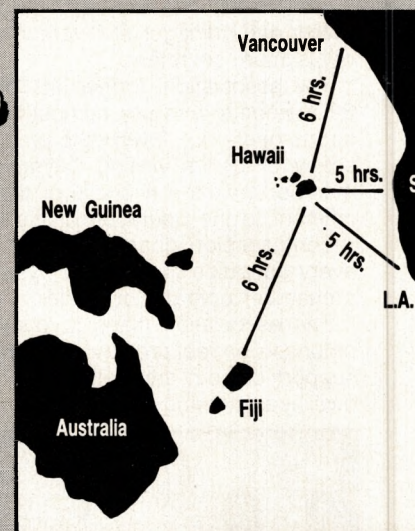
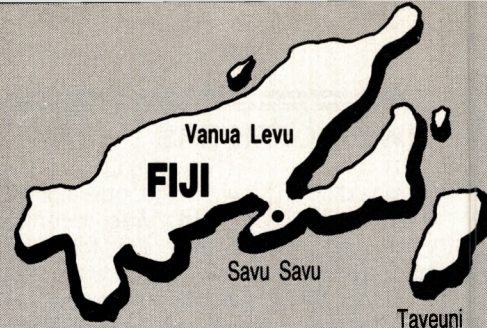
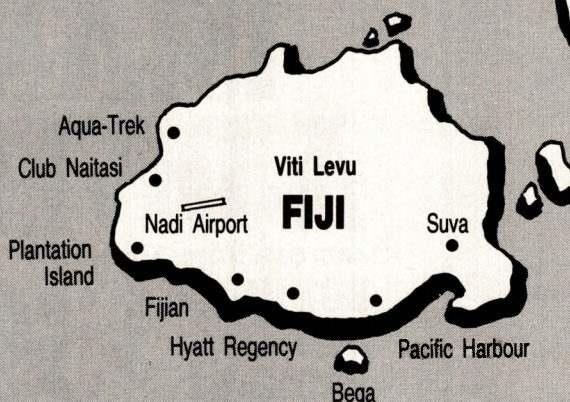


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Photo by Les Fields

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SEA OF CORTEZ PHOTO SEMINARS

Underwater photo seminars in the Sea of Cortez, Mexico are offered through November by Baja Expeditions, Inc. Aboard the M/V *Don Jose*, Nikon Photo Seminars are led by well known diver/photographer Marty Snyderman. In cooperation with Nikon, Inc., specialized underwater cameras, lenses and equipment are available to participants.

On walks ashore, these trips offer a unique opportunity to photograph the stark landscape of desert islands and the flora and fauna of the Baja Peninsula.

The *Don Jose* sleeps 20 passengers and is equipped with a darkroom for E-6 processing. Trips are eight days long. Included in the cost are all meals and one night's hotel accommodation.

For further information contact Baja Expeditions, P.O. Box 3725, San Diego, CA 92103. In California telephone (619) 297-0506 or, outside California, (800) 843-6967.

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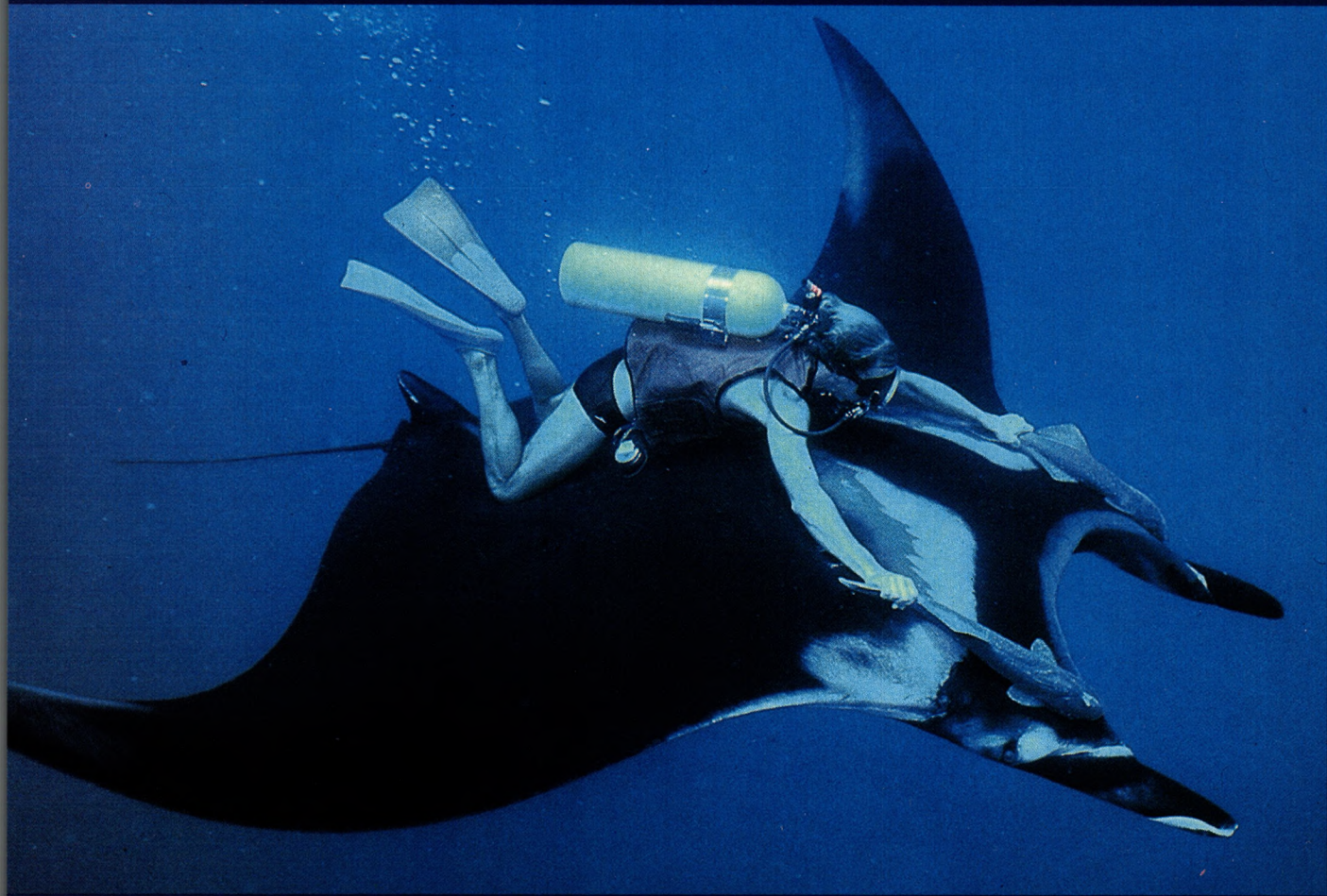
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In Mexico, they say everything's bigger in the Baja. When you dive in Loreto, you'll know what they mean.

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TREASURE ISLAND

AN EXCITING NEW DIVE RESORT ON CAYMAN'S SEVEN MILE BEACH



Treasure Island Resort has 290 rooms, 96 condominiums, two huge freshwater pools and two spas. Its picturesque sandy beach hosts a wide variety of watersports including Jet Skiing, waterskiing, parasailing, windsurfing and snorkeling. Offshore dive sites include the famous wreck of the *Oro Verde*.



TEXT AND PHOTOGRAPHY BY STEPHEN FRINK

Predicting the future is a hazardous endeavor, but it is with great confidence I predict success for Treasure Island Resort. The elements necessary to create satisfied dive travelers are already in place. First, the resort is on Grand Cayman, known worldwide for its quality of diving. Crystalline visibility with excellent populations of marine life combine with dramatic terrain to provide excitement; calm, sheltered seas add consistency.

The popularity of the island with traveling divers, coupled with its proximity to the United States, contributes a second important ingredient, accessibility. There are three major air carriers serving Grand Cayman with several flights daily from a number of different gateway cities. As well as its superior diving and inexpensive access, Treasure Island Resort has additional elements necessary for a first class vacation—superior accommodations, a professional dive operation and affordable dive/lodging packages.

The Treasure Island story began several years ago with a condominium complex in need of financial rescue. The location was ideal—at the head of Seven Mile Beach—but it required foresight and commitment to transform this property into the showplace it is today. Randy Davidson is an entrepreneur with numerous successful Nashville music enterprises. He had been coming to Grand Cayman at every opportunity for six years and realized the potential of the property. He then called on some of his friends for support in creating a resort hotel at this beautiful beachfront site. His friends happened to be country music stars. As a result, the limited partners in the project came to be Conway Twitty, Larry Gatlin, Ronny Milsap, Earl Thomas Connley, Deborah Allen, Dave and Sugar, Helen Cornelius and Jerry Reed. Don Denbow joined Davidson as a general partner and the

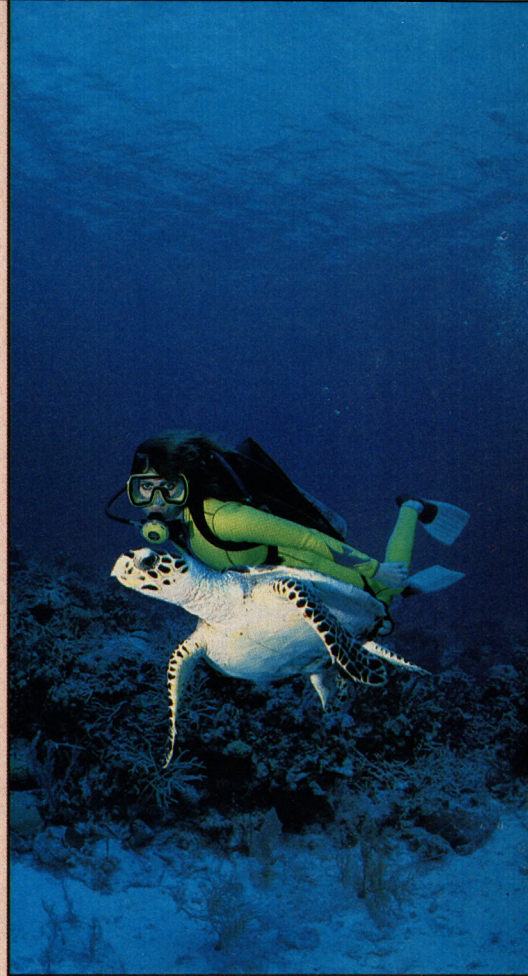
project began to take shape.

Once this impressive pool of investors was formed, massive renovation and construction totally transformed the property. New freshwater swimming pools were built, fountains installed, a breakwater and dock constructed, a dive shop erected and a brand new 290 room hotel rose to spectacular being. Best Western Hotels recruited Treasure Island as an affiliate, adding the convenience of the Best Western reservations system and the confidence the hotel will meet or exceed the standards of the chain.

Today, the hotel offers 145 king rooms,

when they discover that L'Escargot is operated by chef Otmar Webber, formerly of the Grand Old House.

Not surprisingly, given the resort's ownership, music and entertainment are important to the Treasure Island concept. To that end, the nightclub was built to Nashville recording studio specifications and, in fact, can accommodate 24 track recording sessions. The resident band, the Sons of the Beach, are talented musicians who worked in Nashville for many years before bringing their repertoire of '50s, '60s and '70s music to the island. When the limited partners are on the



comprised of a living room suite with king sized bed, refrigerator, wet bar with over-sized sink (just right for rinsing camera gear), bathroom with shower and tub, satellite color television, balcony or patio and, of course, air-conditioning. Another 145 rooms offer two queen sized beds while the other amenities remain similar. There are lovely underwater photographs in each room and four elevators in the five story hotel complex. A nice touch is the provision for a safe in every room. No matter how secure an island, there is often a sense of unease as valuables are left behind in the hotel room. Here, a safe is provided with a five digit combination known only to the guest, not as a necessity but as an additional little peace of mind. There are 96 condominiums on the property as well, some of which are three bedroom, but most are two bedroom, two bathroom units, each with full kitchen, air-conditioning and color television.

Two huge freshwater swimming pools and two spas decorate the central courtyard. A picturesque sandy beach hosts a wide variety of watersports including Jet Skiing, water skiing, parasailing and windsurfing. The property and pools are attractively landscaped and the front lobby, with its imported marble floor, is especially impressive. Longtime visitors to Grand Cayman should be reassured regarding the quality of the hotel restaurant



Top left: Treasure Island Resort dive boats *Milsap Diver*, *Gatlin Diver* and *Twitty Bird Diver*. Above: Treasure Island Resort restaurant. The resort has spectacular dive potential, with the dive boats visiting sites that frequently feature encounters with pelagics.

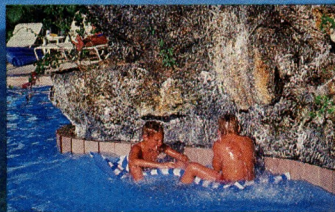
property, they will also make an appearance at the nightclub as well as on the dive boat. In fact, The Nashville Network was so impressed with the potential of the property for country music entertainment they have scheduled four specials for 1987/88. The grand opening of the property was considered auspicious enough to merit media coverage by En-

tertainment Tonight, ABC Radio News, Billboard Magazine, The Nashville Network and People magazine. A correspondent for Lifestyles of the Rich and Famous was even there for the grand opening, but it seems you have to be neither rich nor famous to enjoy Treasure Island. Best Western Hotels are not considered "pricy" hotels. In keeping with that

(Continued on Page 130)



At Treasure Island Resort, we encourage you to set your own pace, to do what you enjoy most ... whether that means swimming laps in the pool or taking a nap in a hammock.



An oceanful of challenging water sports awaits you at Grand Cayman. Scuba diving to jet-skiing, snorkeling to deep sea fishing ... all in the crystal-blue splendor of the Caribbean.



Entertainment is a specialty at Treasure Island – whether that means our world-class chefs entertaining your palate with a culinary masterpiece at L'Escargot, our gourmet restaurant, or possibly seeing one of our celebrity



owners, world-famous stars like Conway Twitty, Larry Gatlin, Ronnie Milsap, Earl Thomas Conley, Deborah Allen, Dave and Sugar, Helen Cornelius, or Jerry Reed, serving up excitement in our state-of-the-art nightclub.



Treasure Island RESORT

Grand Cayman, BWI

For more information call:

1-800-223-4707 (in US)

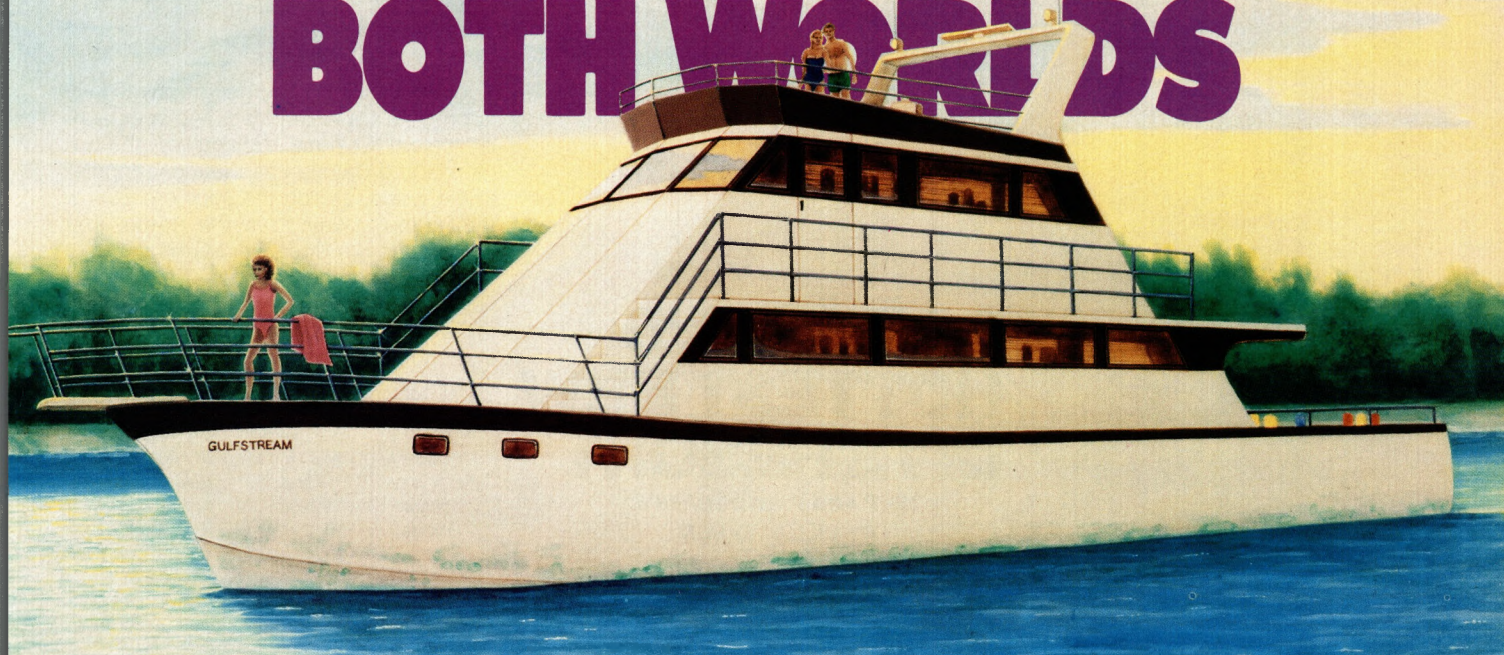
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DIVERS
Grand Cayman, BWI

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CASA DEL MAR

COZUMEL'S HOTTEST NEW DIVE RESORT

TEXT AND PHOTOGRAPHY
BY BILL GLEASON

You need a little island geography to fully appreciate Casa Del Mar. The spectacular reefs of Cozumel, ranked with the Bahamas and Cayman as the most popular in the world, are on the southern end of the island, away from the hotels and town. Although Casa Del Mar is south of town (Cozumel veterans—it's near La Ceiba Hotel), it's still a long haul to the reefs by a slower boat. Here's a chart that compares the old running times with slower boats to Del Mar's running times:

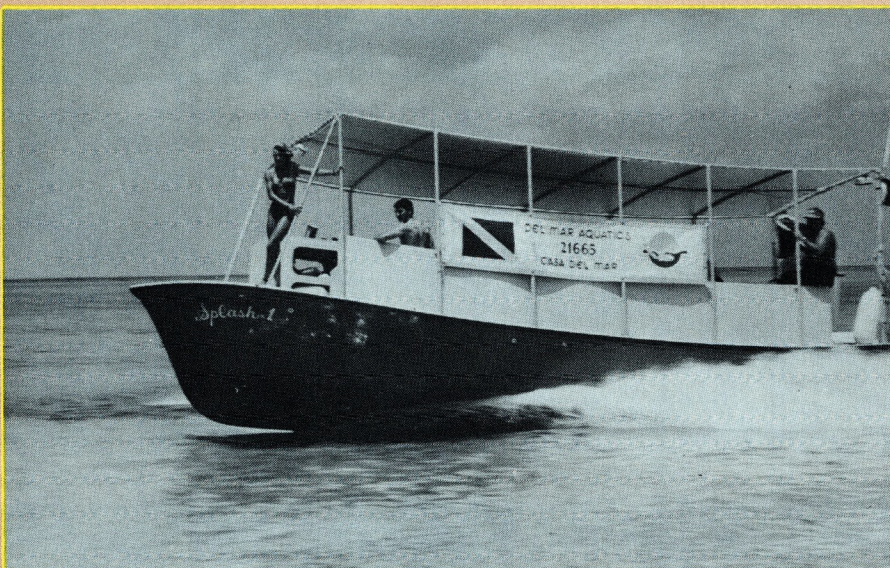
REEF	OLD TIMES	NEW TIMES
Palancar	1 hour 15 min.	25 minutes
Santa Rosa	1 hour	15 minutes
Columbia	2 hours	40 minutes
Paradise	20 minutes	7 minutes

When I first visited Cozumel ten years ago, it was like stepping back in diving time. *Mañana* was not the exception, it was the rule. The boats were old, slow fishing vessels that stopped at various hotels to see if anyone wanted to go diving. Two dives took all day! With the exception of a few small operations, the idea of a dive resort, catering to all the needs of a visiting diver, was only a glimmer on the horizon.

Well, times are changing in dive travel and perhaps in no place faster than Cozumel. The last decade has seen tremendous growth in the quality and service of dive resorts and operations. Casa Del Mar, Cozumel's newest full service dive resort, opened in March of this year and incorporated every change for the better that dive travel has undergone. In a word, Casa Del Mar is hot!

Casa Del Mar, or for those gringos who must have a translation, House of the Sea, has been built from sea level up with diver comfort in mind. The 106 room hotel, with 10 cabañas and 96 double rooms, is nicely laid out facing Cozumel's biggest attraction, the sea. Complete with several restaurants, pool and hot tub, the hotel acts as a first class back-up to the dive center, Del Mar Aquatics.

This brand new full service dive shop and pier are a minute's walk from your hotel room, the pool or restaurant. But, minute or not, *no problema*. You never carry your dive gear at Casa Del Mar. Borrowing from the ski business and several other Caribbean dive operations, Casa Del Mar provides a storeroom for equipment that includes an individual locker with key. As a matter of fact, your dive gear doesn't ever have to see the inside of your hotel room! Just check it into the storeroom (the dive shop is right on the pier) when you arrive; you can dive all week, wash and dry your gear, then pick



it up when you get ready to return home. The dive staff doesn't even like you carrying your gear 30 feet down the pier to the boat. So, if you just take your gear out of the locker and kick back for a minute, one of the guides will get your gear on the appropriate boat. With each passing year, I like this service more and more.

Del Mar Aquatics' boats are all custom designed 36 footers, with more than enough room for dive gear. They feature the convenient, underseat storage area that has come to be associated with all first class dive resorts. They carry no more than 16 divers, so there is plenty of room. A captain, mate and divemaster are your hosts and they'll quickly show you how to work the freshwater shower or help you store your photo gear on the camera table.

The fun really begins when the crew fires up the twin 225 Johnson outboards.

Casa Del Mar gets you to the reefs quickly; you spend your time diving, not sitting on the boat. Two tank dives are available both morning and afternoon. Leave around 8:30 am; you'll be back by 12:30. Leave at 1:30 pm and you'll be back by 5:00. Lunch and refreshments are served on the boat during your surface interval or the boats may pull up to one of the beaches for the lunch break.

Diving in Cozumel is world-class. There are drop-offs and walls that begin in 60 feet of water and plunge to the depths. Mid-range diving on massive coral heads is often aided by a current that constantly brings in fresh, very clear water. Shallow dives in 30-40 feet come complete with trained groupers (50-60 pounds), tame morays and even a pet nurse shark! Cozumel justly deserves its diving reputation as one of the best locations in the world.

(Continued on Page 132)



Above: Casa Del Mar offers 106 comfortable rooms as well as a pool and hot tub. **Opposite page:** Del Mar Aquatics' custom designed dive boats cut the average travel time to Cozumel reefs in half. These dive sites include dramatic drop-offs, pinnacles with encrusting orange sponges and more. **Right:** Divemaster Terri Dethloff offers a tidbit to a friendly gray angelfish.



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See and Sea (see their ad this page)



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commence between April 1 and September 30, 1987. Other restrictions apply.

Diving News From Down Under

Jervis Bay Sea Sports

BY GERI MURPHY

If you happen to be visiting Sydney, Australia and have a day or two to spare, you may wish to sample the diving along the New South Wales (NSW) coastline. While it may not be quite as spectacular as the Great Barrier Reef, this part of Australia still offers good diving. And, a visit to Jervis Bay can be quite a treat.

Just 100 miles south of Sydney and 130 miles from Australia's capital, Canberra, Jervis Bay is surrounded by pristine white beaches, rugged sandstone formations and natural bushland. It is home to wallabies, kangaroos, king parrots and majestic sea eagles that soar over the clifftops. Temperate climate and warm waters make this a popular vacation destination. Diving conditions are ideal year-round because the northern and southern headlands curve around to form a sheltered bay.

Jervis Bay Sea Sports was formed by Patricia and Adrian Cookson in January 1982, after they fell in love with the area while traveling the eastern coastline of Australia. Patricia manages the operation while Adrian heads the dedicated diving staff. Adrian has been diving for more than 23 years and instructing for 16. He has logged more than 1,000 dives at Jervis Bay and has introduced some 16,000 divers to this area.

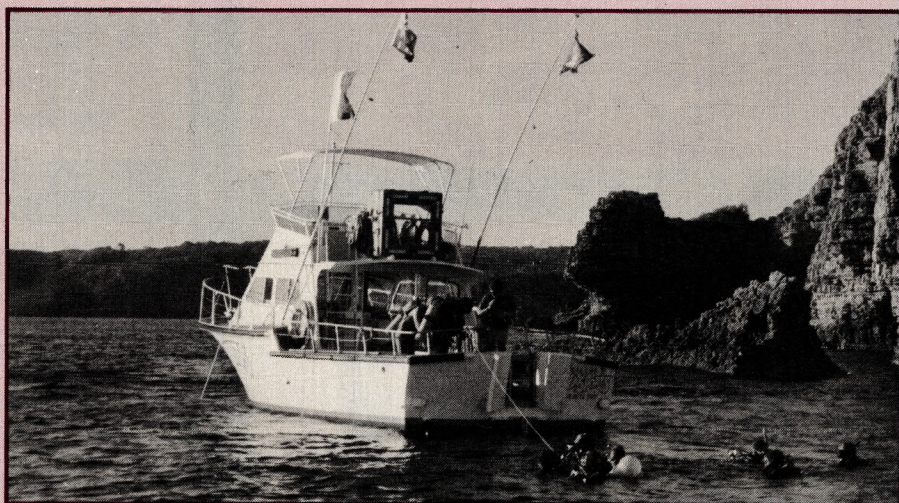
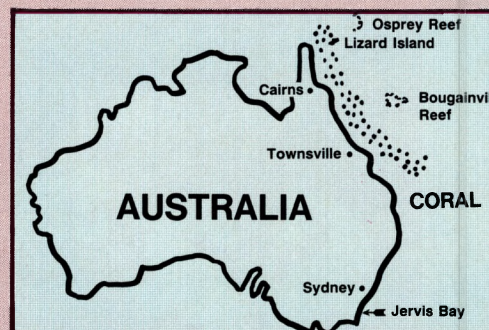
Jervis Bay Sea Sports diving charters get you to the best diving in Jervis Bay, with pinpoint accuracy. The *Sea Life III* is a completely equipped, 37 foot, twin-powered, flybridge cruiser set up for diving. She comfortably handles 18 divers plus all their gear on two dive, one-half day trips. Divemasters and guides ensure your dives are enjoyable and soup, coffee, tea and biscuits are served at the end of each one. The Cooksons have recently commissioned their new vessel, *Seascope*—a 28 foot boat that will take as many as 12 divers on single dives with a quick turnaround.

You will find an exotic terrain U/W: deep caves undercut in the coral, massive archways, stone staircases stepping down 200 feet, huge potholes and an occasional rock rising out of the sand.

As you get closer, you will find the terrain covered with rich marine life that



Jervis Bay Sea Sports diving charters get you to the best diving in Jervis Bay with pinpoint accuracy. Here, the 28 foot *Seascope* makes a smooth, high speed run.



The 37 foot *Sea Life III* can carry 18 divers and their gear on two tank, one-half day trips.

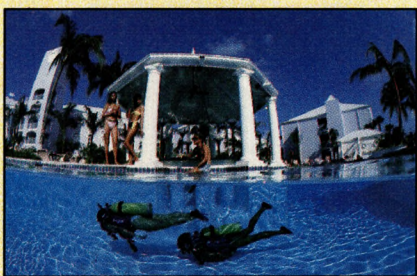
would keep an U/W photographer happy for hours. There are at least 1,000 species including: sponges of every color, rainbow-hued seafans, feathery seapens and slender seawhips. There are great clouds of schooling butterfly perch, yellowtails, tiny blennies, huge cruising groupers and wrasses. Among the star attractions are wobbegongs (ornately marked sharks that reach a bit more than six feet), giant cuttlefish and the rare and beautiful sea dragon (a cousin to seahorses and pipefish). Visibility can reach 150 feet, but normally it is 75.

Jervis Bay Sea Sports is right on the bay at Huskisson. A multi-service dive operation, it offers everything a visiting underwater enthusiast could want. There is a wide selection of equipment, including an extensive range of rental gear. It is

also a full PADI instruction facility. Training aids include video, audio/visual and overhead projectors as well as appropriate theory support materials. Learn to dive and specialty diving programs are conducted on a regular basis. To help visitors identify local marine life, Sea Sports maintains an index with some 2,000 slides.

Adrian and Patricia Cookson also run the Sea Sports Lodge, providing comfortable, inexpensive accommodations in the heart of Huskisson—close to the wharf, dive shop and beach. Cooked breakfasts are part of the service and the good old Aussie barbecue is a regular occurrence.

For further information contact Jervis Bay Sea Sports, 47 Owen Street, Huskisson, N.S.W. 2540 Australia; telephone (044) 41-5012 or (044) 41-5598.



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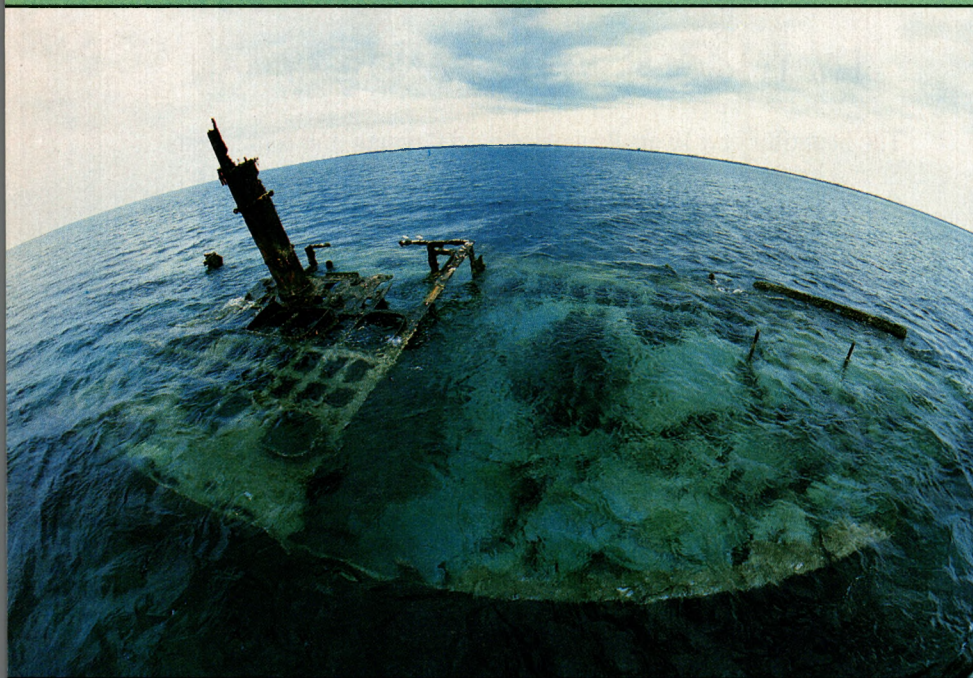
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ANDROS



UNDERSEAS



They say if you listen carefully, you can hear them deep in the pine forests. The locals call them "chickcharney;" they're mischievous little elf-like creatures with three fingers and three toes, long beards and piercing red eyes. The infamous, but legendary chickcharney may be imaginary animals to the outsider, but to the people of Andros, they are very real.

History has documented the chickcharney well. It is said that if you mistreat the little creature, you will experience ill will and great suffering. The well celebrated case of former British Prime Minister Neville Chamberlain is a good example. He came to Andros to build a sisal plantation for making rope. It is said he built his plantation on a chickcharney nest, cutting down the very pine trees from which the creatures hung with their long tails. The plantation was soon ruined and Chamberlain suffered greatly during his later political years.

The devilish chickcharnies may be the Bahamian answer to the unexplicable, but to every coin there is a flip side. For those who are friendly to the chickcharney, great wealth and good fortune will follow. When Neal Watson came to Andros in 1983, he had done his homework



Above: Neal Watson operates three successful dive resorts in the Bahamas. His Andros Undersea Adventures offers excursions to the Poto-mac (top left) as well as shallow and medium depth reefs and steep walls where large pelagics are often seen.

well. With a smile and a good sense of humor, Neal approached the locals with an idea of expanding his Underseas Adventures dive operations. Today, with a first class resort, and a little help from the chickcharneys, Neal Watson enjoys full bookings and a repeat business year after year.

Neal Watson's operations have become well known among sport divers who want a degree of adventure and true virgin diving. Holder of several world records, Watson, with his unpretentious charisma, is a sound businessman with three successful Bahamas resorts, a staff of professional dive instructors and a fleet of custom boats.

The very same ingredients that make Neal's Bimini and Chub Cay operations so successful are what make Andros Beach Hotel an attractive dive destination. A single phone call to Neal's airport offices in Ft. Lauderdale can arrange your complete vacation package including air travel, accommodations, all meals and unlimited diving.

Andros Beach Hotel is in the tiny village of Nicholl's Town on the northeast corner of Andros Island. Barely 30 miles from Nassau and about 150 miles from Florida, Andros contains a very large bar-

rier reef. More than 140 miles of untouched coral gardens separate the sugar-sand beaches from the deep indigo of the Tongue of the Ocean.

Self-sufficient Andros is the largest of the more than 700 Bahamas islands. It is also the least populated; Andros Beach Hotel is one of only two resorts on the island. The main industry is farming, both cattle and agriculture. The island is also a source of fresh water for the scattered island country. More than one million gallons of fresh water are barged to Nassau from Andros daily.

In early 1980 Neal passed through Andros with a friend, stopping briefly at the hotel. The quaint setting, with the tall coconut palms shading the beachfront resort, created an ambiance much like a scene from the movie *South Pacific*. Neal knew the potential of Andros diving and in 1983 he came back to open a complete diving resort. Today, Andros Beach Hotel has ten fully air-conditioned rooms, three cottages and two villas. And, even when the resort is filled (maximum 26 people) there are no crowds.

The newly refinished restaurant and bar overlook a freshwater swimming pool

reef sites such as the Cathedrals, Petrified Forest and Black Coral Canyon have large coral heads and sand chutes that wind past trees of black coral. Massive platelets of shelf coral, like huge roof shingles, cascade down the reef slopes. Each overhang and coral ledge is home to lobsters, moray eels, groupers and little macro critters.

Beyond the reef line the deep walls of the Tongue of the Ocean are an unpredictable cruising area for eagle rays, turtles, schools of horse-eye jacks, amberjacks and silvery sleek barracudas. Closer to shore, massive formations of elkhorn coral grow within inches of the surface. The clustered groups of corals dot the shallow blue-green waters like islands in a sea of sand. Swimming through the fragile corals is a little like being in a giant aquarium. Congregations of spadefish, multi-hued parrotfish, angelfish, spotted coney and tiny blue chromis playfully dart around in a busy underwater city that never rests.

Andros Undersea Adventures offers the most diving of any Caribbean island destination. The package has been arranged to allow two dives on the day of

sights that are easily reached. Morgan's Bluff is just a few miles north of the resort and the highest point on the island. The bluff is a sharp-faced cliff that rises about 50 feet above the sea. Several large caves lead back into open caverns. It is reported that the 17th century pirate Henry Morgan buried his plundered treasure here. The caves are filled with bats, so don't forget to bring your cross and wooden stake if you fear vampires!

Throughout history Andros island has always been a safe refuge for warring ships. A 17th century well the British Navy once used for fresh drinking water is

A Bahamas Hideaway With Bewitching Charm

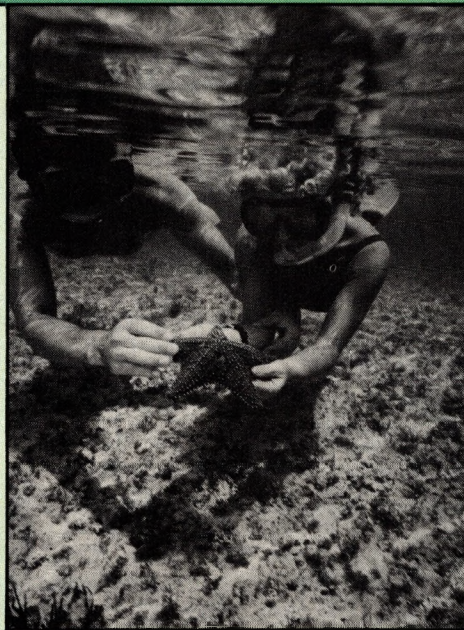
TEXT AND PHOTOGRAPHY
BY GREG JOHNSTON

bordered by a large sundeck and chaise lounges. There are boardsailers, underwater scooters, volleyball nets and a complete pro dive shop with rental gear. At this latter, two full time instructors are available for resort scuba courses or student referrals. Two custom dive boats: the 40 foot V-hulled *Wall Diver* and the 30 foot *Humble II* are conveniently docked adjacent to the dive shop and only minutes away from some of the prettiest reef sites in the Bahamas.

Some of the popular sites regularly visited include Sailfish Reef, Conch Alley, Horseshoe Reef and the wreck of the *Potomac*. The *Potomac* is a 200 foot steel freighter that ran aground during a hurricane in 1926. Many years have taken their toll on the old ship. In 1979, when hurricane David passed over Andros, the vessel was wrenched in half.

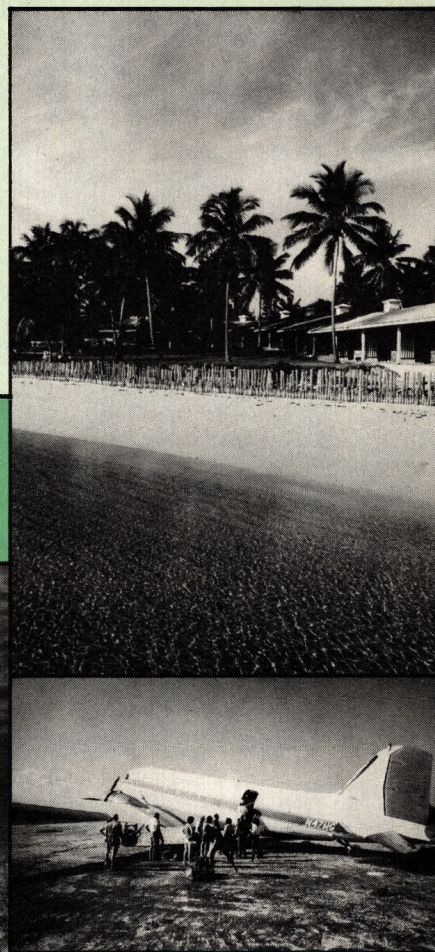
Today, the stern section of the *Potomac* is scattered over several acres of reef while the bow section remains intact in less than 25 feet of water. Much of the hull is accessible. Penetration is safe and simple through the many hatches and gangways. The bow section is home to thousands of minnows. Tiger groupers hide in the many nooks and crannies.

In depths ranging from 60 to 100 feet,



arrival, three dives per day during your stay, and two dives on the day of departure, including several planned night dives. The dives on the day of departure, as with any day of diving, are optional. It is up to the discretion of the individual.

If you do decide to skip a day of diving, the island has many interesting historical



The Andros Beach Hotel (top) is one of only two resorts on the island. A single phone call to the Undersea Adventures toll free number can arrange a complete vacation package including air travel, accommodations, meals and unlimited diving.

still in existence. Often, when the square riggers of the pre-Civil War era were anchored offshore, the easiest way to remove refuse was to dump it into the water. Snorkeling offshore from the hotel, you can still find many bottles more than 100 years old.

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ANDROS UNDERSEA

is a small outlet called Androsia where fine cotton clothing is spun and sold throughout the islands. Closer to the resort and back in the pine forests are several freshwater blue holes. These are good snorkeling and picnic areas. But, remember, be cautious of where you are in the pine forests. If you should happen to cross the path of a chickcharney, smile and be friendly, the creature could bring you great wealth. Good luck!

For color brochures and more information, call Neal Watson's Undersea Adventures toll free at (800) 327-8150; in Florida (305) 763-2188, or write Neal Watson's Undersea Adventures, P.O. Box 21766, Ft. Lauderdale, FL 33335.

OUR WORLD-U/W SCHOLARSHIP

Michael Topolovac, 20, has been awarded the 1987 Our World-Underwater scholarship. The other two scholars are Wesley "Rocky" Strong, 23, of Charlotte, NC and Donna Schroeder, 21, of Lake St. Louis, MO.

Topolovac, of Del Mar, CA, is a sophomore at Stanford University, majoring in ocean engineering. He is both NASDS and NAUI certified. He is presently photography editor of the Stanford Daily and a residential assistant. He has been a freelance photographer and a research assistant at Hubbs Marine Institute; an engineering assistant at Scani Valve Corp; a mechanic and a deckhand on a long range fishing boat. At Hubbs he designed an infrared camera system; assisted in deploying and testing a towed array at NOSC's Transdec facility; and was also a working diver. He assembled and repaired various pieces of deep water oceanographic metering equipment as well. His scientific research paper, "Laminar Extension and Transitional Location in a Heated Boundary Layer," was published in Base magazine at Berkeley in 1985. This led to a Sea Grant scholarship (\$10,000). Topolovac was governor of California Boy's State in 1984. His goal is a Ph.D. in ocean engineering.

Since 1973, the Our World-U/W scholarship has been awarded annually to an outstanding individual planning to pursue a career in a water-related discipline.

The purpose of the Our World-Underwater Society is to further the advancement of education in the underwater and water-related activities, primarily through the funding of this annual scholarship.

For more information on the scholarship or an application, write Our World-Underwater, Box 4428, Chicago, IL 60680.

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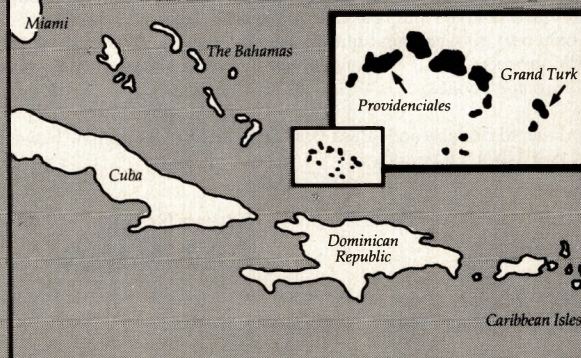
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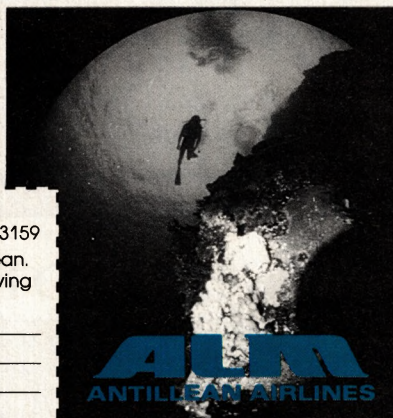
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For information on ALM scheduled service from New York or Miami, call your Travel Agent or Dive Shop.

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TREASURE ISLAND

(Continued from Page 115)

theme, Treasure Island is priced on a par with most of the beach hotel properties on Grand Cayman. Dive/lodging packages offer even greater price incentives.

The diving services at Treasure Island feature the same sort of commitment to quality that is evident throughout the property. Ashton Ebanks has had nine years of experience working with Clinton Ebanks in the Grand Cayman dive industry and Arthlee Evans has worked at Spanish Bay Reef, Bob Soto's and started Quabbin Dives more than eight years ago. Collectively, they offer more than 30 years of experience in diver service and are the guiding force behind Treasure Island Divers.

The dive center is along the beach, fairly distant from the hotel complex. There are 27 acres within the development and ample beach frontage, but only a narrow portion of the beach offers the depth necessary to accommodate the dive boats at the dock. The walk from the hotel to the dive center can be a short, pleasant stroll if you are unencumbered, or an exhausting, tiresome trek if you are laden with heavy dive gear. To assure the former rather than the latter, a fleet of golf carts and trailers transports divers from the hotel lobby to the dive center for the twice daily departures (plus night dives). Guest gear storage lockers are available at the dive center, so camera gear is probably the only bit of personal equipment that need be carried from the hotel.

The dive boats have been custom-built for diver convenience and are 45 foot V-hull fiberglass vessels powered by Detroit 6V53 turbocharged diesels. They are capable of 18 knots under a light load and 14 knots with a full complement of fuel and divers. This is considerable speed for a dive boat and, of course, translates into an extended range of available dive sites. Each boat has been equipped with custom rails and oversized dive platform, extended ladders, tank racks, freshwater shower, head, oxygen and first aid equipment, and VHF radio. Two of the boats will be based at the dive center and one will be docked in the North Sound to access the exceptional North Wall dive sites. The *Gatlin Diver*, *Twitty Bird Diver* and *Milsap Diver* comprise an impressive fleet. The dockside dive shop has two Mako compressors with 9,600 cubic feet of air storage, 200 new aluminum cylinders, stabilizing jackets, regulators and an extensive inventory of masks, fins and snorkels. All that remains is to add a complete underwater photo center with E-6 film processing, photo instruction, camera and video rental equipment and a knowledgeable resident photo pro. That aspect of the opera-

tion was under construction when we visited the resort in April and will certainly be in place by the time you read this article.

Mid-July should introduce yet another exciting facet to the Treasure Island dive services. The custom live-aboard dive boat *Gulfstream* is a brand new 65 foot fiberglass vessel powered by twin 700 horsepower turbocharged diesels. It is set up to accommodate 16 passengers in eight double staterooms. Each stateroom will have a hot and cold water wash basin and a porthole. The vessel will feature two 40 kw generators, two 400 gallon per day capacity watermakers, two 18 cfm air compressors, three showers and three heads, E-6 film processing, VCR and underwater video and, of course, will be fully air-conditioned. Built in the United States, the *Gulfstream* is U.S. Coast Guard approved for international travel. It is the longtime dream of Buddy Brown, owner of Buddy's Dive Shop in Islamorada, Florida Keys. Buddy is also a part owner of Treasure Island Divers and will introduce the *Gulfstream* cruise as part of a package concept coupling land based day dive trips at Treasure Island Resort with two or three night live-aboard excursions. The tremendous range and variety of diving available with this sort of package is exciting and offers an attractive compromise between a traditional seven day live-aboard cruise and a hotel based dive package.

Treasure Island Resort offers a beautiful hotel with spectacular dive potential; a professional, friendly dive service with exciting options such as live-aboard cruises and an extended range of day dive sites; first class entertainment; fine dining; and a magnificent beachfront location—all at a reasonable price.

For further information or reservations please contact Treasure Island Resort, 3730 Vulcan Drive, Nashville, Tennessee 37211 or phone toll free (800) 223-4707. In Florida phone (800) 367-4707. 🌴

HALL'S DIVING CENTER EXPANDS

In the Florida Keys, Hall's Diving Center has completed an expansion program that has almost doubled the capacity of the store and the career institute. The new facility is on the highway at the Faro Blanco Resort, only two doors from the old location. The 40 foot dive vessel, pool, classrooms, dive center, resort, institute housing, restaurants, cocktail lounge and other resort stores and services are now on one single property.

The new address and phone numbers are: Hall's Diving Center and Career Institute, 1994 Overseas Highway, Marathon, Florida Keys 33050; (305) 743-5929 or toll free outside Florida (800) 331-HALL. 🌴

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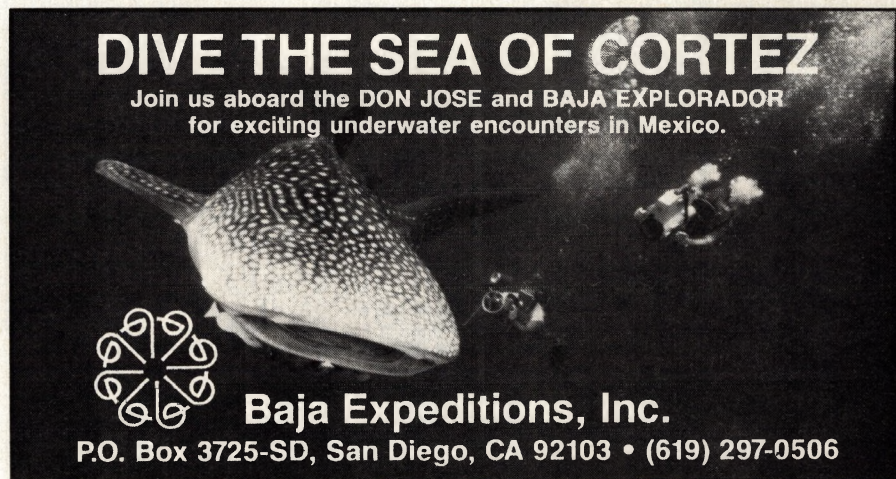
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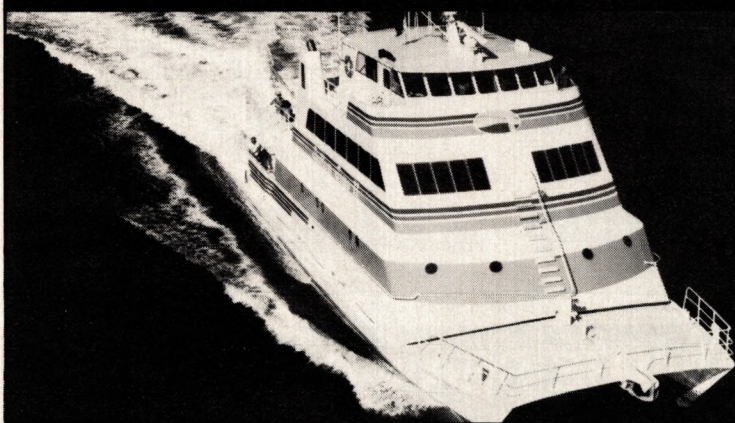
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CASA DEL MAR

(Continued from Page 118)

My favorite dive sites include Santa Rosa, where you can watch groupers being handfed on the top of the wall. I'd also recommend a deep dive on Santa Rosa as well. Palancar Caves (80 feet) is my choice for photography, with an abundant amount of outcrops, overhangs, cuts, caves and tunnels to choose from. Palancar Gardens (at 50-60 feet) might be even better from a photographic point of view. I was surrounded by jacks and other schooling fish and the coral was abundant. Tormentos, when the current isn't running, is another favorite angelfish and grouper feeding station. If the current is running, it's a fabulous drift dive.

One word of caution: Although the staff meticulously checks C-cards and provides excellent dive orientations, it's always a good idea to tell them whether or not you've ever gone drift diving before. Riding a gentle current is one of the great kicks in recreational diving and it's easy when you've done it once or twice. But let the divemaster know it's your first time and he'll take special care to explain little techniques that make it easier.

The staff at Casa Del Mar/Del Mar Aquatics is a group of seasoned instructors and divemasters. General manager Daniel Ayala is a PADI master instructor with more than 15 specialties. He will greet you and give you an orientation. His English is better than mine. Don't expect to see Ayala on the boats, however. Running Del Mar Aquatics is a full-time, land based job. A full staff of instructors and divemasters takes care of the boat work. Terri Dethloff, a PADI instructor with seven specialties, will take care of any teaching or courses, and Carlos Mena, an 18 year veteran of Cozumel diving, is the head dive guide. If you're a frequent reader of *SKIN DIVER Magazine*, you've probably seen an ad with a diver with sunglasses on underwater—that's Carlos Mena. Dive with him and watch this pro go to work. At home feeding groupers, eels and nurse sharks, Carlos' dives are always special.

Casa Del Mar is not only a top-notch resort, it's also one of the best bargains in the diving world. A week, complete with diving, is only a little more than \$400 per person. Because of the peso/dollar relationship, you'll be pleasantly surprised at just how inexpensive Cozumel is. Dinner for two, with wine, at a good restaurant, is usually less than \$20-\$25 and there are plenty of less expensive places. Premium diving, excellent accommodations and a real service-oriented dive operation combined with inexpensive prices is good news for all divers.

For more information contact Two Worlds Travel, 1307 First Street, Humble, TX 77338; (800) 446-2166 or, call collect in Texas, (713) 446-2166.

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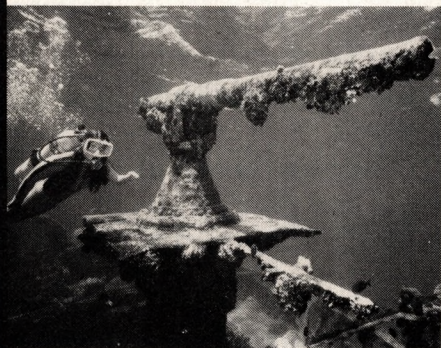
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DIVERS DEN/KEY LARGO

Ray and Teresa Lang recently opened their third Divers Den. The new Key Largo dive store stocks a complete line of Scubapro, Dacor, U.S. Divers and other major brands of equipment. Divers will be able to find virtually anything they need, or may have forgotten to pick up before leaving home, once they get to the Keys.

A PADI Five-Star Instructor Development Center, Divers Den of Key Largo is at 110 Ocean Drive, only a few hundred yards off U.S. 1, just opposite the Holiday Inn's Holiday Harbour Marina at Mile Marker 100. The store's location makes diving the reefs of Pennekamp Park very convenient. With two boats in the marina, Divers Den now runs charters to all the best reefs in the area, including many that are rarely or never visited by other Key Largo operators.

Aboard the gleaming white, completely rebuilt, 50 foot dive yacht *Good Time*,



divers can get to the park and surrounding sites in comfort and with maximum speed. The dive yacht is licensed to carry 52, but trips normally run with just more than half that many passengers. For small groups, there is a six passenger dive boat, *Reef Runner*.

In addition to the always popular explorations into the park for photography, underwater sightseeing and wreck diving, the Langs also offer spearfishing and game collecting trips to reefs outside Pennekamp.

Although spearfishing with scuba is certainly permitted on the reefs and small wrecks that he has discovered, Ray Lang's personal preference is to take game using only snorkel and fins. He is capable of free diving to depths of more than 110 feet and can scour the deep reefs and bring home his catch while holding his breath at 90 feet or greater for up to two and one-half minutes.

Winner of more than 130 major awards and trophies, Lang has been competing in the sport of spearfishing since 1976. He has won the SFDC Florida State Spearfishing Championship every year since 1980 in either the team or individual categories. As a member of the Florida team, he has won the U.S. Nationals twice and has taken home the individual championship once. In 1983 he was a team member at the international competition in Chile and is leading the All American team—defending national champions—to Istanbul, Turkey for the World Spearfishing Championships this month. Lang is also the recipient of the prestigious 1983 Spearfishing Athlete of the Year award given by the Helms Hall of Fame. The foundation that gives this award recognizes athletes in all forms of



sports for their outstanding achievements. A French manufacturer of dive and spearfishing equipment is also currently featuring Lang in its national SKIN DIVER ad campaign owing to his high visibility in the spearfishing sport.

With many people again realizing that spearfishing is a viable way to collect their own seafood, the Langs thought it only natural to share Ray's experience. As a result, Divers Den's boats regularly venture outside the protected zone of the park to allow their passengers to experience the challenge of spearfishing.

Both the Miami and Fort Lauderdale Divers Dens run regular trips to the excellent reefs and wrecks just north of the Florida Keys. Special one day dive charters to the Bahamas are run regularly as well. In the Keys, Divers Den has complete packages with the Holiday Inn.

For information on all the charter and training services available call Divers Den toll free at (800) 527-DIVE. When in the area, stop by the Miami store at 12614 N. Kendall Drive, (305) 595-DIVE; or the Fort Lauderdale store at 8280 State Road 84, (305) 473-9499. The phone number for the new Key Largo store is (305) 451-DIVE.

BAY ISLANDS PACKAGES

Seven night packages are now available at Anthony's Key and CoCo View resorts in Roatan or Bayman Bay and Posada del Sol resorts on Guanaja. Both islands offer warm, clear water and excellent diving.

For more information contact Go Diving, Inc., 715 Florida Avenue South, Minneapolis, MN 55426; (800) 328-5285 or (800) 328-0734.

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NEW CAYMAN BRAC BOAT

Peter Hughes Diving and Divi Hotels have announced the arrival of another custom dive boat, the *Brac Fever*, at the Tiara Beach Hotel in Cayman Brac.

The new 40 foot vessel was constructed by Michael Fitz Custom Boats, Inc. of Naples, Florida. The *Brac Fever* is powered by twin Perkins V-8, 350 hp diesel engines and is capable of speeds up to 32 knots. She accommodates up to 20 divers in virtually any sea conditions experienced around the Cayman Islands. Equipped with all of the amenities commonly found on other Peter Hughes dive boats, *Brac Fever* offers divers safety, comfort and convenience. Peter Hughes Dive Tiara opened in July of 1985, under the direction of general manager, Craig Burns. With 42 air-conditioned rooms, Divi Tiara Beach Hotel is just steps away from a white sand beach. Tiara offers all-inclusive package rates for the diver and nondiver.

Reservations and information can be obtained from recognized travel agents or Divi Hotels Marketing, Inc. (607) 277-3484; toll free (800) 367-3484 in the U.S. and Canada.

SCADO

Dive tour operators based on St. Croix, U.S. Virgin Islands have recently formed the St. Croix Association of Diving Operators (SCADO). The association's ultimate goal is to promote St. Croix as a diving tourist destination. The association is also interested in increasing local diving safety standards and preserving and protect-



ing the coral reef environments.

Members of the association include Caribbean Sea Adventures, Cruzan Divers, Dive Experience, Sea Shadows, SeaSport, Inc. and V.I. Divers Ltd. The West Indies Laboratory of Fairleigh Dickinson University serves as an advisor on marine environmental issues and diving safety.

More information about the association and diving in St. Croix can be obtained by writing the St. Croix Association of Diving Operators, P.O. Box 425, Fredericksted, St. Croix, U.S. Virgin Islands.

DATAMASTER II

(Continued from Page 104)

creases, the Dive Time Remaining decreases. If the dive is fast and deep (such as 120 feet), chances are the Dive Time Remaining will be dictated by the limits of the no-decompression table. You will probably be running out of bottom time before air supply. In this case, an NDC symbol will appear to the left of the Dive Time Remaining.

On the other hand, a medium depth dive (50 feet) might be a different story, especially if you are a heavy breather or up against a strong current. There is a good chance you will run low on air before you reach the limits of the no-decompression tables. In this case, the Dive Time Remaining will be based on your tank psi, depth and breathing rate. The computer checks the tank psi every second and then averages the psi drop over a one minute period and calculates the rate of consumption. You can easily recognize the switch to air monitoring because the AIR symbol will appear to the left of the dive time and the NDC symbol will disappear.

Depending on the present depth and remaining psi, the Dive Time Remaining will switch back and forth between the NDC and AIR computations—always selecting the one with the least amount of time. The Datamaster II is programmed for the safest dive possible.

Caution Zone Display: When the Dive Time Remaining display reaches the last ten minutes, a new display kicks in. It is called the Caution Zone, and it means just what it says. It is the Datamaster II's way of telling you that you have reached the critical part of the dive and it is time to head home.

Positioned in the center of the LCD screen, the Caution Zone display is crescent-shaped and resembles an automobile speedometer.

The crescent is divided into small LCD segments, each representing one minute. The crescent is calibrated with a plus ten (+ 10) on the right, a zero (0) on the top center, and a minus ten (-10) on the left. As the Dive Time Remaining decreases from 10 to 9, to 8 and so on, the flashing segment on the crescent moves from the right to the left—moving toward the zero mark that is the no-decompression limit.

In the center of the crescent a number corresponding to the Caution Zone value is also displayed. For example, the eighth segment to the right of the zero and a +8 means that at some point in the dive you came within eight minutes of the no-decompression limit (0). You soon find that the Caution Zone becomes the central focus of your attention. It is hard to ignore.

When should you start heading for the surface? Most certifying organizations and noted authorities in the field recommend you don't push the tables to their

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DATAMASTER II

limits. Oceanic follows this philosophy and suggests that the diver always surface with a minimum of +5 minutes displayed on the Caution Zone—effectively giving at least a five minute safety margin over the no-decompression limits.

As the diver ascends, he/she may gain Dive Time Remaining because of the multi-level capabilities of the Datamaster II, but the Caution Zone will continue to display the closest he/she came to the no-decompression limit during the dive.

In fact, the Datamaster II allows you to make a safety stop at ten feet and get credit for time spent there. For every minute spent, you receive one minute of credit on the Caution Zone. For example, if you recorded a +4 on the Caution Zone at some point during the dive, you could stop at ten feet for one minute and then exit the water with the suggested minimum +5 reading. Because of your personal physical condition or the dive conditions, you may choose to stay at ten feet and receive more credit up to +10.

The Caution Zone allows you to choose your own degree of safety.

Emergency Decompression: The most important safety feature of the Caution Zone display is that it will provide assistance in an emergency decompression situation. While the Datamaster II is not a decompression instrument, it does not leave you hanging with no guide.

If you exceed the time limits of the no-decompression table, the Caution Zone display goes into minus minutes. This means you are definitely in trouble and should immediately begin ascent to the standard ten foot decompression stop. Take care not to exceed the maximum rate of ascent of 60 feet per minute.

Just as before, for every minute spent at ten feet, you receive a minute of credit on the Caution Zone. You must remain at the ten foot decompression stop until the Caution Zone display once again reads plus five minutes (+5).

This emergency decompression procedure is a good news/bad news event. The good news is the computer will help you decompress and get you back to the surface safely. The bad news is that the Datamaster II will not give you the Dive Time Remaining, Caution Zone, PDPS or Group letter displays for the rest of the day. It automatically shuts these functions down for 12 hours after the last dive of the day that included a no-decompression violation. This follows the accepted philosophy of teaching organizations of not making repetitive dives after a decompression dive.

It will, however, continue to function as a full service instrument console with pressure, depth, time and temperature displays. The best advice is never let yourself get into a decompression situation. Watch the computer screen and

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start heading home when the Datamaster II tells you to.

Surface Interval: Once you complete your dive and surface, the computer screen switches to a new display. According to the U.S. Navy tables, you must remain on the surface for a minimum of ten minutes to complete the dive. The Datamaster II ensures this rule by flashing the word SURFACE TIME until the full ten minutes have transpired.

If it is submerged before the mandatory ten minute surface time, the LCD screen switches to the standard Surface Time Display that includes: max depth, air temperature, tank pressure, dive number, repetitive dive group letter and accruing surface time. If you hook up the Datamaster II to a fresh tank and open up the valve, after 15 seconds the Surface Time Display will be interrupted by the Pre-Dive Planning Sequence.

The Datamaster II will continue to display the Surface Time Display even when the regulator is removed from the scuba tank. This feature allows for tank changes between dives. The computer will automatically go into sleep mode and shut off its display screen 12 hours after the last dive of the day.

Repetitive Dive Planning: In order to properly plan your next repetitive dive you must first connect the regulator to a fresh tank and turn on the pressure. It is important to remember the Datamaster II will only start the Pre-Dive Planning Sequence with a full tank.

As your Datamaster II begins the Pre-Dive Planning Sequence, you will notice the NDC Dive Times are less than before. The new times reflect the nitrogen absorbed on the prior dive and the surface interval time accrued. You are actually viewing time limits for a repetitive no-decompression dive. This is further verified by the appearance of a repet group letter in the lower left corner of the screen. The longer you remain on the surface, the greater the NDC Dive Time limits become. Also, the repet dive group will shift to a lower letter.

Violation Log: The one display you will not see on the Datamaster II screen is the violation log. This data is kept internally and can only be extracted by the manufacturer. The computer has a great memory system. It records the profile of the last dive, the profiles of the last three no-decompression violations and notes up to 256 no-decompression violations made during the lifetime of its batteries.

This data (if any) is reviewed at the time of a battery change or in the event of a serious dive accident. You cannot hide the truth from the computer or its maker.

DIFFERENCES FROM USN TABLES

The Datamaster II is based on the U.S. Navy's Standard Air Tables for no-decompression diving. A comparison of the Datamaster II and U.S. Navy maximum diving times are close, with the Data-

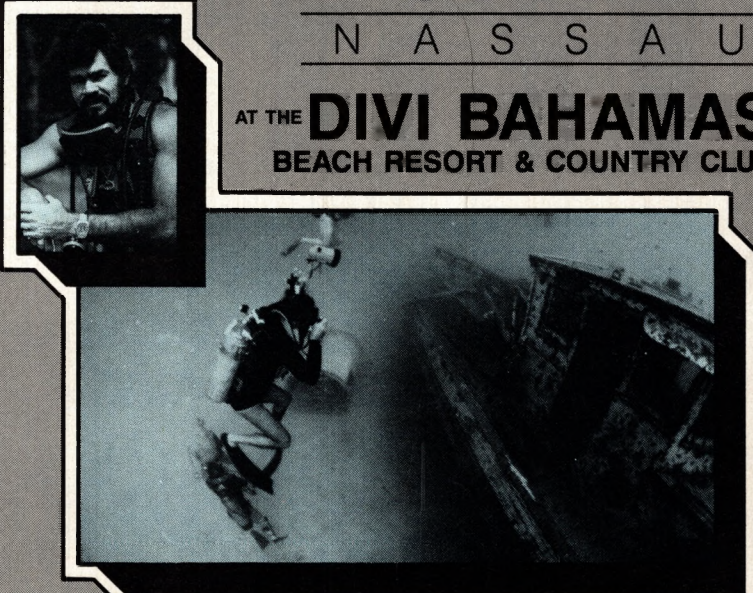
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DATAMASTER II

master II always being either the same or more conservative.

The major point is that the Datamaster II is more conservative than the standard U.S. Navy tables. In fact, this computer plays it very safe by following the Caution Zone rule—lopping five minutes off the allowable Datamaster II no-decompression limit.

For example, on a straight single depth dive to 100 feet, the USN tables allow 25 minutes bottom time. The Datamaster II allows 20 minutes and also urges you to surface with 5 minutes bottom time still remaining. If you follow this Caution Zone procedure, a straight 100 foot excursion becomes a 15 minute dive.

What makes the Datamaster II distinctive is its ability to calculate multi-level no-decompression, still abiding by the basic U.S. Navy decompression formula. On the above dive, the way to optimize your

bottom time would be to spend 15 minutes at 100 feet, which would register a +5 reading on the Caution Zone. Then ascend to a shallower depth, such as 60 feet. At this new depth your Dive Time Remaining will increase dramatically. You can stay at this new depth for times that greatly exceed the standard U.S. Navy no-decompression table limits because of the multi-level capabilities of the Datamaster II. It is possible to increase your allowable bottom times by 50 or even 75 percent by using a "staircase" dive profile.

The concept of multi-level decompression calculations for sport divers was introduced at a NAUI IQ Conference back in 1976. Commercial divers had been doing it for years. The concept is basically very simple. If a diver is planning to make a dive to two or more different depths, it is possible to compute the no-decompression limits for each depth and then link the times together. However, doing these calculations manually can be incredibly complex and tedious. And, there is always a chance of making a mathematical error.

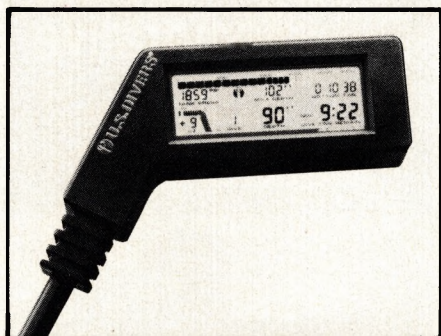
Then came the age of miniaturized computers. Suddenly, it was possible to calculate multi-level dive times in a split second. Now an electronic machine can calculate no-decompression times for 5, 10, 15 or 100 different depths during the same dive. This is what the Datamaster II does. The computer continuously calculates the diver's no-decompression status based on the U.S. Navy tables.

CONCLUSION

The Datamaster II is a far different dive computer from its contemporaries. This is because it is directly tied into tank pressure while the other dive computers tested so far were not.

The Datamaster II is primarily based on the U.S. Navy Standard No-Decompression

sion Tables. But, because of the multi-level capabilities of this dive computer, you can greatly extend your bottom times and still stay within the accepted U.S. Navy no-decompression limits. Many divers will feel comfortable with the thought that this computer operates in a manner with which they are familiar. This doesn't



U.S. Divers' Data Scan II computer utilizes the same basic logic as the Datamaster II.

mean the other dive computers are bad and this one is good. It is just a difference in approach to multi-level diving.

It is very important to understand that the Datamaster II is not a decompression dive computer. It is strictly a no-decompression instrument. Oceanic repeatedly stresses this point. If you intend to do a lot of decompression diving, I suggest you shop for a different computer.

The Datamaster II's ability to provide the diver with dive time remaining based on calculated air consumption makes it especially unique. A diver will never run out of air as long as he or she follows this dive computer's directions. In my book, this one feature makes the Datamaster II doubly safe.

COST

With the rising costs of diving travel, divers are looking for quality vacations that maximize their time underwater. The Datamaster II does just that. If you were to pay \$1,200 for a vacation and did 10 dives, your cost per dive would be \$120. With the Datamaster II you can easily increase your bottom time by 50 percent; if you were to count this as the equivalent of 15 dives your cost would go down to \$80 per dive. This represents a savings of \$40 per dive. Multiply that by ten dives and it comes to \$400. This almost pays for the Datamaster II in one trip!

The Datamaster II retails for \$525 and will soon be available in more than 500 authorized Oceanic dive stores. Supplies may be limited in the first few months, owing to the time and care required to produce and test these computers. The Mini-Hylite flashlight and SlimLine compass are optional. The Mini-Hylite sells for \$10.50, the SlimLine is \$47.50.

For more information, a catalogue or the location of your nearest Datamaster II dealer, contact Oceanic USA, 14275 Catalina Street, San Leandro, CA 94577-5589 or call toll free (800) 458-8880.

(Continued on Page 145)

BONAIRE



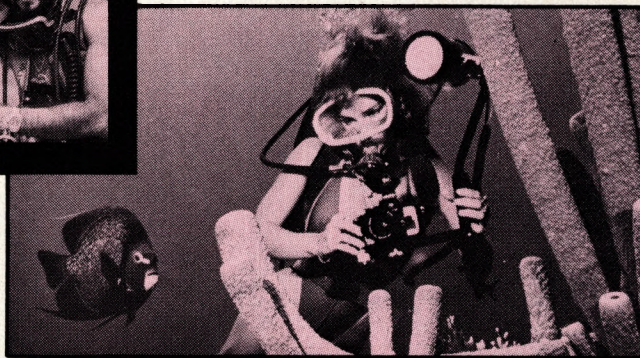
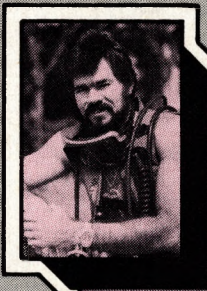
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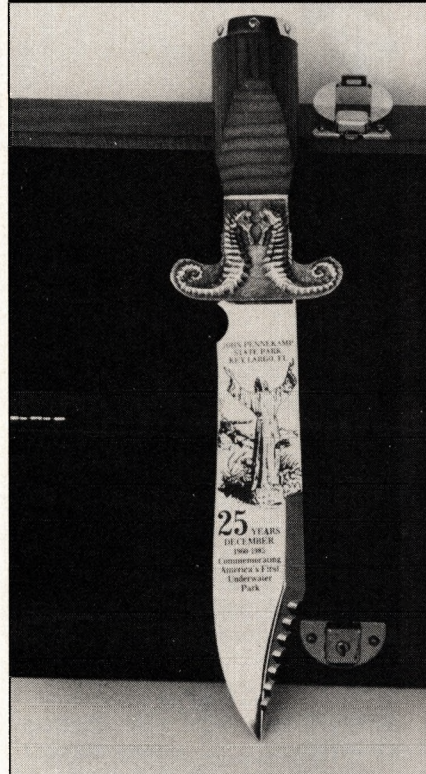
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Wenoka's Pennekamp Park Commemorative Knife

TEXT AND PHOTOGRAPHY
BY BONNIE J. CARDONE



America's first underwater park, John Pennekamp, was dedicated in December 1960. It was named for one of the two men responsible for its creation. An associate editor of the Miami Herald, John Pennekamp was an ardent proponent of the conservation of Florida's natural resources. He was the first chairman of the Florida Board of Parks and Historical Memorials, as well as legislative chairman of the state commission that established the Everglades National Park.

Pennekamp and Gilbert Voss, of the University of Miami's Institute of Marine Science, became concerned with the depletion of Florida Keys reefs by commercial shell and coral collectors. In 1957, Voss proposed the establishment of an underwater park and marine preserve off Key Largo. Pennekamp provided editorial support—through the Herald—that helped make this project a reality.

In the spring of 1960, President Dwight D. Eisenhower proclaimed the chosen area Key Largo Coral Reef Preserve.

Florida Governor, Leroy Collins, renamed it John D. Pennekamp Coral Reef State Park and it was dedicated later that year.

Pennkamp Park boundaries were reduced in 1974, owing to a change in Florida's jurisdiction over ocean waters. In 1975, however, Key Largo National Marine Sanctuary was established. Together, the sanctuary and the park ensure that more than 188 square miles of ocean waters are protected. Shell collecting, coral collecting and spearfishing are not allowed here.

It seems appropriate that a company that has already produced four commemorative knives, reminding divers of the history of their sport, should produce another, dedicated to America's first underwater park. Wenoka's first special knife came out in 1981. It was dedicated to the birth of sport diving; the development in 1942 of the first demand regulator. In 1983, the second commemorative, a reproduction of the first diving knife, recognized the beginning of deepsea diving in the early 1900s. In 1984, Wenoka produced a gold plated replica of the Navy's UDT knife. The Man-in-the-Sea program and SeaLab were commemorated with a knife in 1985.

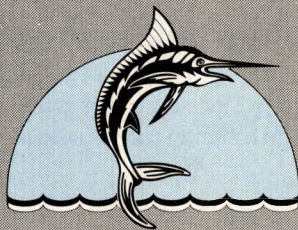
All of these knives are special. Beautifully packaged in carefully crafted velvet and foam lined wooden boxes with brass hardware, they have been designed and produced with great attention to detail. The Pennekamp Park commemorative is no exception. The handle of the knife is pakka wood, stained blue as a reminder of the clear waters found in the park. The butt cap is nickle silver, engraved with scallop shells. The cross guard is also nickle silver, engraved with seahorses, marine creatures indigenous to Pennekamp. Engraved on the stainless steel blade is an illustration of the most famous underwater statue in the world, the Christ of the Abyss. A replica of a statue found in San Fruttuoso Bay, Italy, it was sculpted by Guido Galletti. Edigio Cressi, founder of the diving equipment company that bears his name, donated it to the Underwater Society of America in 1962. The nine foot tall, 2,000 pound statue stands in 21 feet of water in the area known as Dry Rocks. It symbolizes peace and understanding among all divers. Since its dedication in 1966, it has been visited by thousands of divers and snorkelers.

Each of the Wenoka commemoratives is hand finished, with an individual serial number. Each comes with a certificate of authenticity. This is a limited edition series, treasured by collectors. The Pennekamp Park commemorative retails for \$300. The Man-in-the-Sea, UDT and First Diving Knife commemoratives are all still available at this same price. The 1981 Birth of Sport Diving commemorative is no longer available.

For more information on these commemoratives contact your nearest Wenoka dealer or Wenoka, P.O. Box 8238, West Palm Beach, Florida 33407.

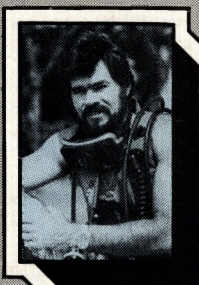
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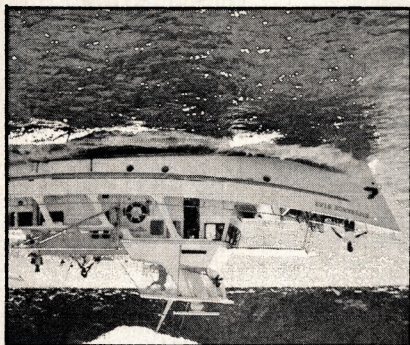
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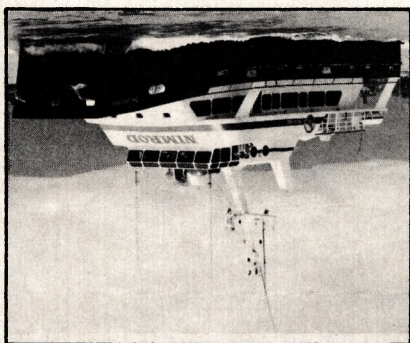
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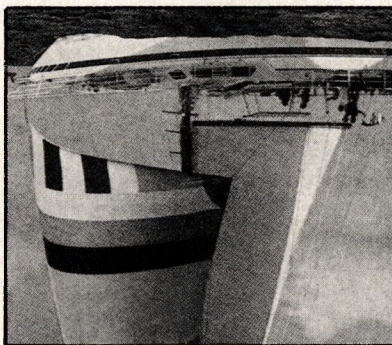
55' MV Esperance Star
8 Divers. Dep: from Cairns to Ribbon Reefs and Lizard Is.



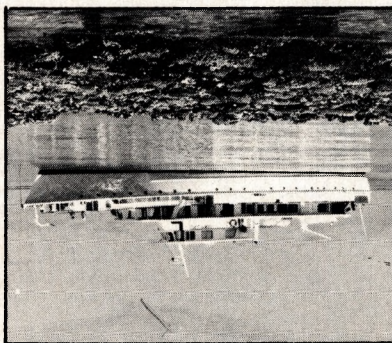
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SHOULD SPEARFISHING BE BANNED?

BY VERNON KEITH

In 1975 Captain Jacques Cousteau told the State Assembly Natural Resources Committee in Sacramento that spearfishermen should be banned from California because their presence "terrorizes the fish populations . . ." In early 1985 the Marine Fisheries Commission in Florida proposed a regulation that would prohibit the spearing of certain species of fish and closed certain areas to spearfishing—all while admitting they had no scientific basis for these actions. The spearfishing controversy rages on. There is much emotion and very little scientific evidence to back anyone's claims.

In December 1984 through January 1985 I conducted a study on the effects of spearfishing on coral reef fish populations off Punta Solimon, Mexico. The reef in that region has been commercially spearfished for more than 50 years and was compared to the nearby unfished Underwater Ecological Refuge off the island of Cozumel. The results were not quite what I had expected.

The data were collected by marking ten meter square plots at different depths. A count was made of all fish in or swimming through the plots for a period of ten minutes. The count was done from the surface at a distance of at least 50 feet. Scuba was not used because the sounds made by regulators are known to have an effect on fish behavior. Species of animals found in the plots normally speared by local fishermen were put into one of five groups: large predatory fishes, small predatory fishes, easily speared fishes, less desirable fishes and crustaceans.

The data collected showed there were slightly more game fish in the fished area. This was probably owing to a dramatic increase in the numbers of less desirable fishes that serve as prey for the large predatory fish, such as grouper. The number of these large predators was reduced significantly because they are popular game for spearfishermen. When the predators were decreased their prey increased in number. The smaller predators, such as snapper, are heavily harvested in that area and therefore decreased in abundance.

It was shown through statistical analysis that the total numbers of game fish found in the two areas were not significantly different. The depth at which similar species of fish were found was significantly different and the number found in each of the five groups was different.

The behavior of the fish was different between the two areas. Fish in the protected Underwater Ecological Refuge

were easily approached. Some fish had even been conditioned to take food from divers. The fish from the fished area were difficult to approach and stayed near heavy cover or deep water. Fish seem to adapt to the presence of spearfishermen and become more difficult to spear.

Spearfishing in the study area has been mostly by professionals. In other areas I have often seen so called "spearfishermen" killing fish for fun and leaving them on the bottom or spearing a fish and returning to the boat to ask if it is a "good one." This disgusts me. Most ornamental fish are more valuable as an aesthetic resource rather than a food resource.

I feel the results of this study show spearfishing done by responsible divers is not detrimental. It reduces the numbers of some of the popular fish, but others will increase because of their absence.

Laws protecting certain species of fish are a start in solving the problem but educational efforts are needed. One solution would be to require a spearfishing license and mandatory training for licensees that would include fish identification and spearfishing ethics.

Spearfishermen are suffering from the same problem that terrestrial hunters are facing. There are a few jerks out there who are ruining it for the rest of us. ❦

NAHR/SAND DOLLAR

Andre Nahr has opened Sand Dollar Dive & Photo on Bonaire. The shop is attached to Sand Dollar Condominiums. Nahr provides all orientations to divers and personally guides many of the dives. He also provides a full service photo facility to divers and land photographers alike. Trips to Washington Park, picnic trips, snorkeling trips and special guided night dives are available.

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For more information contact the Travel Barn, 50 Georgetown Road, Bordentown, NJ 08505. In New Jersey call (609) 298-2298 or, toll free, (800) 345-0508. ❦

DATAMASTER II

(Continued from Page 141)

The U.S. Divers version of this dive computer, the Data Scan II, will also sell for \$525. It will be available soon at authorized U.S. Divers Aqua-Lung dealers. The U.S. Divers version will perform all of the same functions, with the exception of a temperature read-out. Instead, the Data Scan II will contain a graphic presentation of tank pressure in the form of a horizontal bar graph.

For more information, or the location of your nearest Aqua-Lung dealer, contact: U.S. Divers/Aqua-Lung, 3323 W. Warner Avenue, P.O. Box 25018, Santa Ana, CA 92799-5018. ❦

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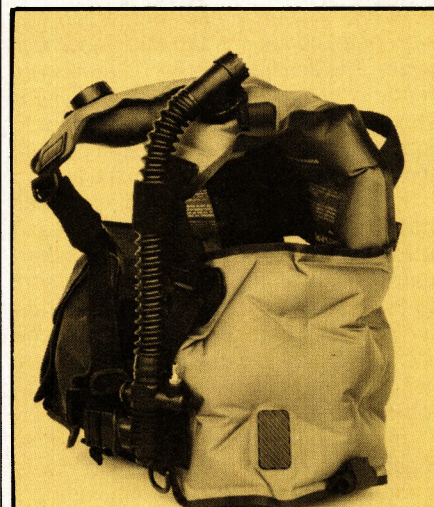
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photos/Bonnie J. Cardone

CALYPSO
SBC Mattress-Style
Buoyancy
Compensator

BY JIM WALKER

Air mattress: The words bring to mind thoughts of relaxation and comfort in the outdoors. Often, an air mattress is used for flotation at the water's surface, whether riding the waves or just relaxing in a pool. Probably never before has anyone thought about taking their air mattress *under* the water. Now someone has: The Calypso SBC—the first mattress-style buoyancy compensator.

As the acronym indicates, the Calypso SBC (Single Bladder Concept) is bladderless; it is made of one layer of super-tough 420 denier packcloth coated with waterproof urethane. This material is welded together at all seams and an interesting pattern of circular welds over the body of the BC assures a neat, hydrodynamic profile. These welds give the SBC its mattress-like look.

In addition to being welded, all of the SBC's seams are sewn under sturdy nylon edge taping. Stress areas (such as where straps attach) have sewn-on plastic reinforcements.

The SBC incorporates the hottest new design—strap shoulders. However, it takes a slightly different tack: Only the left shoulder strap has a quick-release buckle. The diver merely slips the right arm through its strap, then closes the left strap. This is probably the way many divers use their shoulder strap BCs anyway.

Both of the SBC's nylon webbing shoulder straps offer easy adjustment. The right strap has two plastic D-rings. Pull up on the top one to loosen the strap and down on the bottom one to tighten it. The left strap is tightened in the same way, but loosened by pushing up on the

bottom of the quick-release buckle. Both straps have neoprene sleeves over the buckle (or plastic loops) for comfort and to secure strap ends neatly.

The Calypso SBC has an adjustable, quick-release chest strap and a similar waist strap. It also has a wide neoprene comfort band around the inside of the waist. This is suspended from the body of the BC and helps keep it snug against the diver's chest, even underwater.

The Calypso SBC utilizes an ultralight plastic backpack (the Alpine Backpack). This has extensions at the waist that support the comfort band and, topside, distribute the weight of a scuba tank on the hips instead of the shoulders. The tank band is flexible nylon webbing with a rub-



The Calypso SBC's backpack has a nylon webbing tank band with plastic buckle.

ber sleeve to prevent slipping. It adjusts with Velcro and closes with a unique plastic snap-over buckle. The buckle can be instantly joined *after* the band is around the tank, then snapped tight. There is a second, Velcro closing band above the primary band. This stabilizes the tank. It also has a nylon webbing carrying handle.

The SBC comes standard with one large pocket on the diver's right. It closes with Velcro and has Lycra Spandex on the outside for stretch and easy drainage. The bottom of the pocket is secured with a Velcro tab. An extra regulator second stage can be slipped behind it and held in place by another Velcro tab/hose guide (the Octo-Loop) that can be pulled loose easily in an out-of-air emergency.

The SBC has a combination manual/power inflator/deflator mechanism attached to the left shoulder. Pulling down on its corrugated hose opens a dump valve at the top. A low pressure hose is provided with the BC for power inflation. Additionally, the SBC has a manually operated dump valve on the right shoulder.

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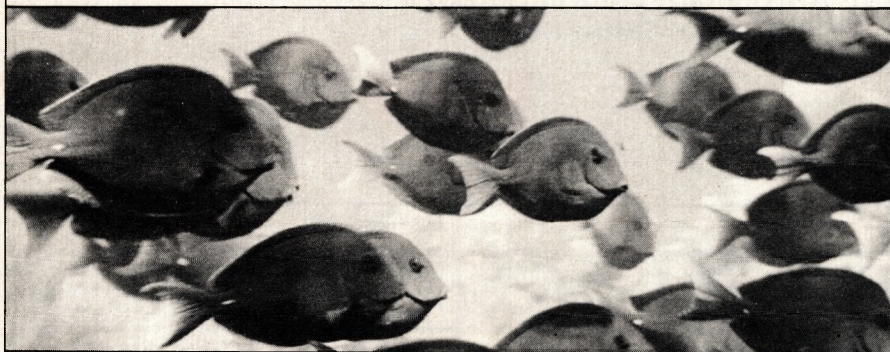
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CALYPSO SBC

The SBC has a plastic D-ring on the comfort band for attaching gear such as goodie bags and there is a Velcro closing hose guide on each shoulder and one on the bottom left.

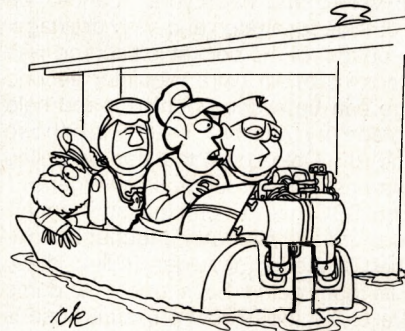


Above: The circular welds in the body of the SBC give it a mattress-like look. The lightweight backpack features a nylon webbing carrying handle. Below: The SBC comes standard with one large pocket.



The Calypso SBC is available in extra small, small, medium and large in royal and navy blue or all black for \$318. An extra pocket is an additional \$28. Try one on at your U.S. Divers dealer. For information contact U.S. Divers, P.O. Box 25018, Santa Ana, CA 95018.

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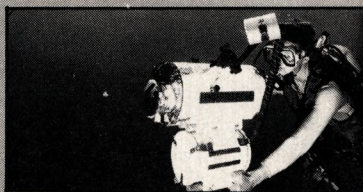
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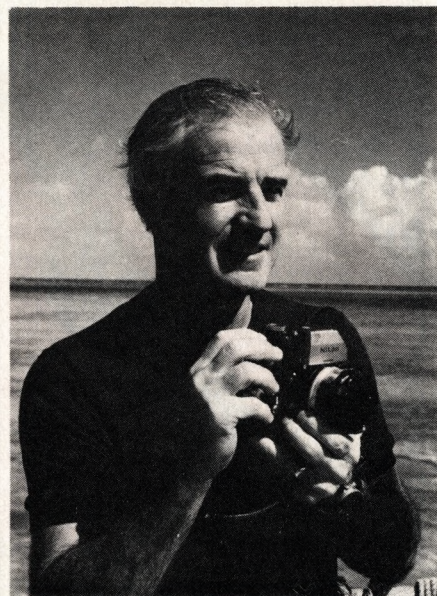


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A South Pacific
 Interview With

**CARL
 ROESSLER**

BY HILARY ROOTS

Author of a guidebook to good diving Asports in various parts of the globe, Carl Roessler can well boast of knowing the *Coral Kingdoms*. After almost 30 years as a scuba diver and 20 years as an U/W photographer, this dive travel agent, based in San Francisco, ranks among the personalities worth knowing better. Last year he celebrated the 10th anniversary of the great white shark expedition he organizes annually to South Australia. His route home took him through the French Pacific territory of New Caledonia, where he explored the U/W sites of the beautiful, unspoiled Isle of Pines. I spoke with him there:

HR: Going back to the beginning—how did you become a diver?

Roessler: In 1950, just before entering college, I was a lifeguard and one of my lifeguard friends had a father who was a welder. He acquired some equipment to do some underwater welding and we all tried it. We were already avid spearfishermen. In 1957, after I got out of college and had some money, I was taught to scuba dive for a certificate by SKIN DIVER's Paul Tzimoulis.

HR: What can you remember about the

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CARL ROESSLER

gear you had at the time?

Roessler: Unbelievable! We had equipment that had come mainly from France or Italy—spearguns and various fins, masks and snorkels. When we started diving off New England in the cold water with scuba tanks—we were not moving around so much and stayed down longer—we had to get wetsuits. They had smooth rubber on both sides, so you couldn't get into them—they would stick to your skin. So, you poured in corn starch, which provided a dry surface and helped you slide into the suit. Of course, when water got in, it turned the corn starch to paste and you ended up with a white paste all over your body when you came out—the messiest, nastiest thing!

We used to drive four or five hours, then take an hour or two boat ride, dive for 30 minutes and then reverse the whole process. We'd get up at five in the morning and get home at 11 pm, all for 30 minutes in the water! I don't see how anybody who started diving then ever stayed in it. It was really hardship diving.

HR: Rather like those who started diving in the cold lakes of Switzerland.

Roessler: Very much. Once you begin to feel like a diver, apparently you will put up with most anything to get that feeling. But, I stopped putting up with everything like that by about 1964. I stopped diving in the cold water off New England, took my first trip to the Caribbean, rented tanks and a car, drove out in the Virgin Islands or Jamaica, to places where I had a local fisherman waiting with a canoe. I took my tank, rolled into the water—a quick dive, thrilling, absolutely thrilling—clear, warm water—fantastic, wonderful. And, that hooked me.

I didn't take up photography until 1967, but from '64 on I was a dedicated foreign traveler to the warm water spots on my vacations—which meant one or two weeks a year. The rest of the time I dreamed about going off on those vacations. So, I know where many of my customers' longings originate—I had all the same ones myself.

HR: Of all the dives you've ever done, can you remember one that stands out more than any other?

Roessler: There are literally dozens of dives that stand out because each one was a special experience. It might have been an animal, such as the great white shark, a shark feeding or a time in the Philippines when a manta ray came in for two days and played with me wherever I went. Or, it could have been on the wreck of the *Yongala* off Australia this past November, when a huge skate came swimming up to two of us so we could photograph it at will. If I sat and thought about it, I could think of any animal—an octopus or a cuttlefish for example—and tell you

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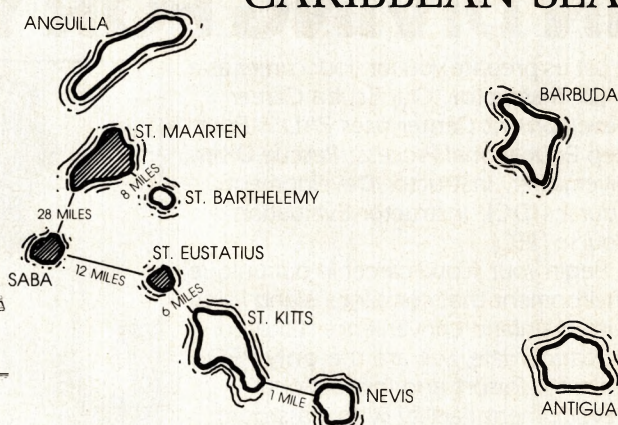
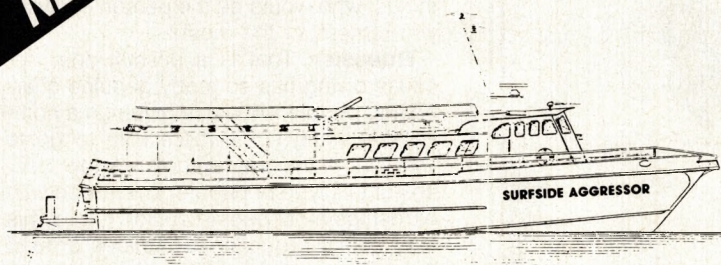
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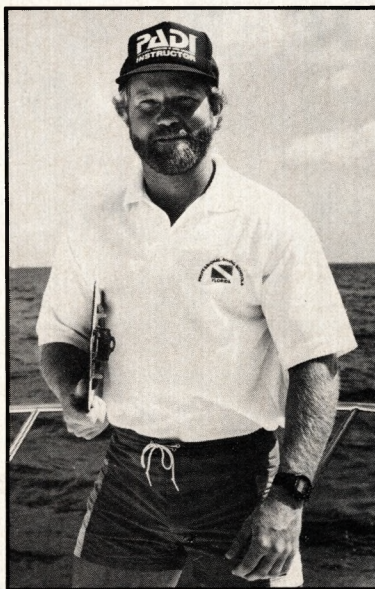
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CARL ROESSLER

many tales about encounters with that animal in different parts of the world. To me, they're all precious. Even diving in the sand with small animals is wonderful.

HR: Talking about most memorable things, who would be the person in diving you remember the most?

Roessler: That is a difficult one, because diving has so many genuine characters, people who have given up a comfortable living somewhere else to go to very out-of-the-way places. I know dozens of this type of people. They cope with hardships most people couldn't. . . . This very select group of expatriates around the world run reliable businesses with those handicaps and my hat's off to every one of them.

HR: When did you go to Curacao?

Roessler: In August '69. I'd had five years at Yale, trying to help the university establish financial and budgeting systems using computers. My wife asked me one day if I wanted to continue working such long hours and weeks. I said if I had my way we'd all move to the Caribbean and go into the diving business! As soon as the words were out of my mouth it was over—the light had dawned! I quit my job, sold my house and moved to Curacao. My children learned Dutch and went to school there. I dived every day and learned photography, making all the mistakes you can possibly make and trying not to make them again. See & Sea, whose customer and tour leader I had been in '67/'68, sent groups to me. I was very lucky in trying this idea when the field was not crowded. I had the opportunity to live in the tropics, to try to understand a tropical operation from both a customer's and an operator's point of view. Three years later I bought into See & Sea and began running an operation that sends divers to various parts of the world. I had no illusions after having lived in the tropics.

HR: What's the hardest thing, do you think, about living in the tropics?

Roessler: I would say frustrations such as the inability to get spare parts or find mechanics, schooling for children, medical care—just maintaining the kind of a life you take for granted in a city. You must become much more resourceful. You either find sources for these things or learn to do them yourself.

HR: Why do you think so many divers are now into photography?

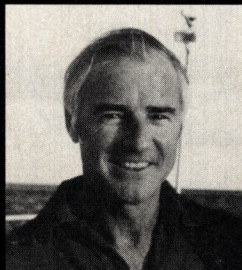
Roessler: It is the only way you can convey to nondivers—friends, family—what you have experienced. You may be a diver for a year or two and be kept in the sport by spearfishing, collecting or talking with your hands. But sooner or later the sport will dry up for you unless the color, excitement and animal behavior can be brought back for yourself and

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CARL ROESSLER

others to see. I would say, among American divers, most of those who have not taken up photography have eventually dropped out of the sport.

HR: Do you think a lot of it comes from powerful advertising on the part of photographic equipment manufacturers?

Roessler: No, I think it just opens people's eyes to the fact they could bring back something to show what they saw and put it on a screen or on their office wall as a print. It's a way of reliving those moments underwater when they see something brilliant yellow, purple or hot pink and they say, nobody understands that at home. I have to get a camera and show them.



photos/Carl Roessler

Author/traveler Carl Roessler is also known for his underwater photography.

HR: What, as a general rule, is the ratio of good photos to the number of photos people take underwater?

Roessler: There has long been a rule of thumb that if you got one good photo out of a roll of film you were doing pretty well. For the diver who can dive only a week or two a year, that's probably true. The professional photographer gets more practice, but tends to shoot fewer subjects and take safety pictures—if you want one, you take six.

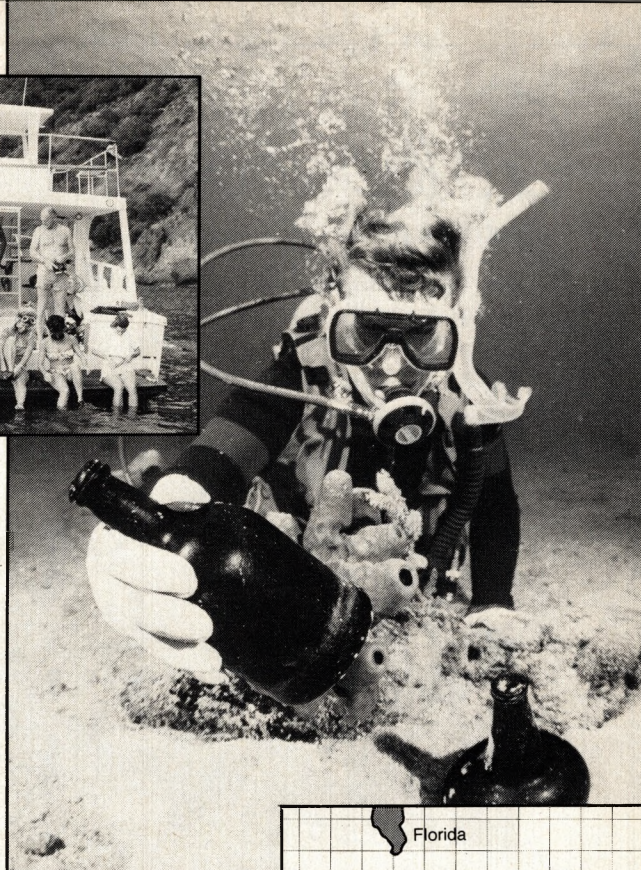
HR: For someone starting out, what is the basic equipment?

Roessler: The most common mistake is to buy equipment that's too complicated and try to take too many different kinds of pictures. My suggestion is, think of the kind of picture you'd most like to take; it might be a scene to express the whole reef or it might be a macro photo. Buy the simplest possible camera set-up to take that kind of picture, then go out and take them until you're good at it. Fre-

"STATIA"

Caribbean's newest dive destination features a wealth of wreck and reef diving

by George Stockton



"STATIA," as the island of St. Eustatius is commonly called, is one of the newest and richest diving destinations in the world. Located just 27 miles away from St. Maarten in the eastern Caribbean, STATIA played a major role in the development of the New World during the 17th and 18th century. Most ships carrying cargoes of settlers, slaves, trade goods, and soldiers stopped by the port of "STATIA" on their way to and from the "colonies." Hundreds of vessels might be in port at anytime, and the island had a bustling population of 30,000 in the mid 1700's. Today that population numbers less than 2,000, as more direct trade routes were found. Time, indeed, has passed STATIA by. But STATIA remains steeped in history, both above and below water. Fires, storms, and wars took their toll of ships off the STATIA shore, leaving a historical legacy of known and unknown wrecks. SURFSIDE STATIA, the leading dive operation on the island, has begun a program with the STATIA government to recover artifacts from designated sites, identify the artifacts and preserve them for display in STATIA'S Maritime Museum. Divers are invited to join in the search. Imagine the thrill of diving on a ship hundreds of years old! Dense schools of fish call the coral encrusted wreck home. Southern stingrays relax in the white sand surrounding the wrecks. Flying gurnards are just about everywhere you look. And if the marine life isn't enough, imagine finding a cutlass, or brass artifact, or centuries old bottle. In keeping with conservation, all finds are entered with your name in the museum log and are displayed in the museum. If historical shipwreck diving is not enough, there are excellent reefs teeming with marine life. Remember, STATIA hasn't been very popular for over two hundred years, and it's one of the few places left where the diving can really be called "virgin." Diving accommodations are first rate with SURFSIDE STATIA, with a large comfortable boat and helpful crew. STATIA itself is a study in historical tranquility, with old homes and forts to explore, and a smiling, english-speaking local population. It is a RULE in STATIA that you must say "hello" to everyone you meet! There's a range of accommodations from guest houses to small hotels. I recommend STATIA highly. It's a quiet, unusual dive vacation that will soon disappear in the midst of ever increasing Caribbean tourism. For more information on "STATIA" diving, call 1-800-468-1708. In PA call 1-717-346-6382.

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CARL ROESSLER

quently, the best place to start is close-ups of invertebrates that are motionless on the reef, so you can stay in one place, try again, bracket your exposures and adjust your lighting. The subject won't swim away in the middle of the session!

HR: How did your great white shark expeditions start?

Roessler: In 1975 *Jaws* came to the screen in the states. Australians Ron and Valerie Taylor and Rodney Fox had been involved in filming the underwater scenes and they suggested to me and my then partner, Dewey Bergman, that there might be a specialized tourist market. We thought it a wonderful idea and announced it the very first day *Jaws* appeared in the theaters. The first trip ran in January 1976 and my first cover photo in *SKIN DIVER* (July 1976) was of a great white shark taken during that expedition. Out of eight days we had three days of glorious sharks in fairly murky water, but we were just so thrilled, we've been running them ever since.

HR: How many people have you put through in that time?

Roessler: The number is still very small. We've put through perhaps 30 to 35, and in all, including film crews, the number hasn't been more than 100. National Geographic has been out there as has the American Sportsman program with Peter Benchley. We've specialized in taking clients to look into the face of this most beautiful of animals.

HR: Is it really so beautiful?

Roessler: Oh, it's the most beautiful animal in the sea.

HR: But, do you think that's what attracts people or is it the idea of being able to conquer a big threat and fear?

Roessler: I think it's probably directly analogous to filming rhinos, crocodiles, elephants or other large game close-up. You try to find the proper guide and place as well as the proper equipment. The purpose is not to go and really risk your life, it is to go and observe an animal that has a particular fascination for you. White sharks fascinate a lot of people, but the combination of cost and distance have kept the numbers way down. Also, the families of divers tend to veto this expedition in 95 percent of the cases!

HR: What is the atmosphere like inside the cage?

Roessler: Electric, electric, exciting! Even during long, boring intervals when the shark is away chewing and digesting and may not come back for 10 or 15 minutes, everybody is on a jazz, a high; they're completely frenetic, the adrenalin is flowing full-blast, day after day.

HR: Have you seen sharks docile?

Roessler: Sure. I've spent six days in an area known to have white sharks, such as Dangerous Reef or Memory

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CARL ROESSLER

Cove and no sharks appeared even though we were introducing substantial amounts of bait into the water. This means the sharks make very long patrols, and unless something attracts them in, you would never know they were there. Even if they passed, you wouldn't know they were there, they're like ghosts in the water.

HR: What's the most particular observation you've made about white sharks in the years you've been watching them?

Roessler: Oh, I would say we've heard many myths and satisfied ourselves they were not true. One was that sharks are insatiable, mad dogs out to kill—not true. They are simply very effective ocean predators. Their prey, sea lions in general, is so alert and quick that unless they are extremely clever stalkers in the gloom and the night, they'll go hungry. So, they've mastered the sneaky approach—you just never see them coming until they've arrived.

HR: Is that how it is when you are inside the cage?

Roessler: Oh, frequently. We will have spotters up on the boat, and when the water is clear a spotter may be able to tell us from which direction they're going to come. But, in visibility of 20 or 30 feet, common in white shark areas, very likely if you are in the water, you would never know what hit you.

HR: How long do they stay around?

Roessler: We've seen the same sharks for as many as seven days.

HR: How big are they?

Roessler: Up to 15 feet—9 feet for the smallest, 15 feet for the largest.

HR: Let's talk about another subject: Why do you prefer women models?

Roessler: To get away from the stereotype of the macho, spaceman, hoses-hanging-out-all-over-the-place diver. A woman or a child makes the best model to show this is not a hero sport, that anyone, older people as well as younger, can enjoy the sport with equal facility. A woman adds an element of glamour and a child adds that certain special wonder only a child can bring; both I consider the very best of models.

HR: You speak of diving as a sport, but lots of people consider it a discipline.

Roessler: It's both. Certainly, to be good at it, you master a discipline. However, there are many people who are not very good divers and still have wonderful fun. They do it only perhaps a week or two a year, which is part of the reason they're not good at it, but go off in benign conditions and get wondrously excited; go back and tell all their friends about it and want to come back the next year.

HR: How many years do you hope to continue diving?

Roessler: I'll dive until I die. 🐟

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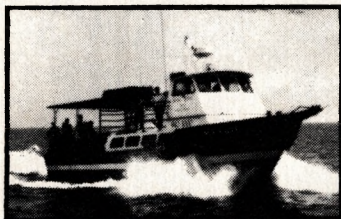
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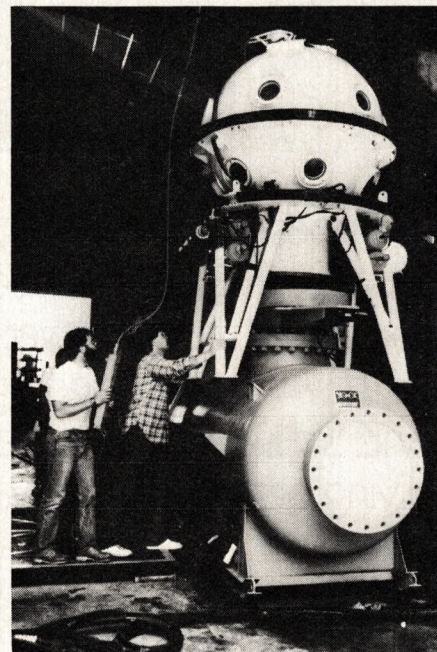
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SBCC

For the average sport diver, a dive as outlined above would be heady science fiction. For graduates of the Marine Diving Technician program at Santa Barbara City College, it would be reminiscent of some of their days of high-tech training as they worked their way through two years of multidisciplinary courses that culminated in an Associate in Science degree and full qualification as an entry level commercial diver.

When most people, including most sport divers, fantasize about going diving, they mentally enter a world of gin



photo/Stan Crapo

A submersible work chamber (diving bell) is mated to a deck decompression chamber (DDC), where divers will decompress.

clear water and brilliantly colored coral and fish; a friendly marine environment. Such is not the real world of commercial diving. Typically, a working diver goes U/W in a cumbersome outfit to do a heavy, dirty, sometimes life threatening job. The work is seldom glamorous but it is always challenging. It is for this life that the Santa Barbara Community College Marine Diving Technology program trains its carefully selected students.

ADMISSION REQUIREMENTS

Acceptance to SBCC does not guarantee acceptance to the Marine Diving Technician program. The very rugged nature of student training, as well as the graduate's future work, dictate stringent physical qualifications. Applicants must be a minimum of 18 years of age and have graduated from an accredited high school with at least a C average or an equivalent qualification as determined by SBCC. Transcripts of all high school and college work will be required.

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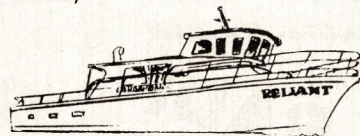
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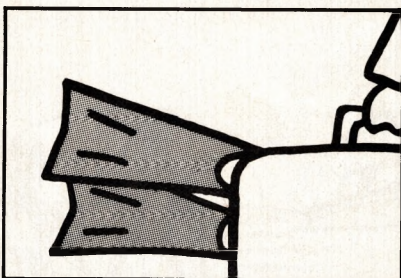
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For training in the MDT program, applicants must provide completed application forms, a release and waiver form and a medical history. Students must also pass a yearly medical examination. Prior to actual acceptance for the MDT program, applicants must successfully perform, in the presence of the SBCC diving officer, the following tests: swim underwater without fins for a distance of 75 feet without surfacing; swim underwater without fins for a distance of 150 feet, surfacing no more than four times; swim 1,000



photo/Steve Barsky

Jerry Clouser is dressed and ready to make a dive in Santa Barbara Harbor.

feet in less than 10 minutes without fins; demonstrate swimming with snorkel and fins with and without facemask; skin dive to a depth of 10 feet and recover a 10 pound object; demonstrate the ability to rescue and carry a swimmer 75 feet on the surface of the water; demonstrate the ability to tread water for 10 minutes without swim aids.

ABOUT THE PROGRAM

Santa Barbara Community College is one of only two colleges in the United States offering a two year diving technology training program. According to Jerald (Jerry) Clouser, chairman of the marine technology department, "Training entry level divers for the commercial diving industry is the goal of the SBCC Marine Diving Technician program. Students are trained in a four semester course that



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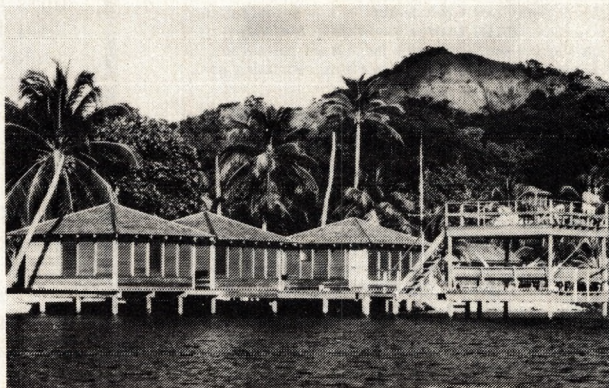
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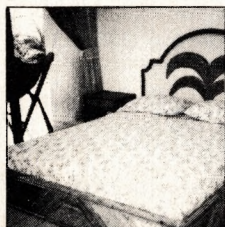
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teaches them to operate and work with some of the most sophisticated diving and peripheral equipment in use today."

Clouser added, "The diving needs of the offshore industries are growing and changing constantly to meet the more sophisticated underwater construction concepts and to cope with the worldwide development of deeper and more urgently required marine resources. At SBCC we continue to change our training program to meet the needs of students who will work in those diverse marine industries."

As marine diving technicians, students must be capable of working above and below the surface of the water with all types of equipment, tools and materials. Finally, they must be able to accomplish the many tasks under unpredictable and frequently changing conditions in a sometimes unfriendly environment.

A review of the curriculum indicates the training program at Santa Barbara Community College consists of three types of courses. Some courses develop the skills and knowledge required of a diving technician, a series of others is designed to give students an understanding of the environment in which they will work; and the third consists of general studies to increase the student's knowledge and communication skills.

MARINE INDUSTRY COOPERATION

An important adjunct to the successful marine training at SBCC is the support to the program by regional maritime industries and various other institutions and government agencies. The MT program was developed, and is continually reviewed and revised by members of an advisory committee, to ensure the program effectively serves the current needs of both the industry and the community.

Members of the advisory committee include representatives from the oil industry, diving service companies, marine construction organizations, oceanographic services and SBCC staff and alumni. The Santa Barbara Medical Foundation Clinic provides expertise in training EMT classes.

Santa Barbara Community College is one of the oldest two year community colleges in California. It was established in 1909 to serve the people of southern Santa Barbara County and is noted for its high level of academic excellence and active leadership in community affairs. It is fully accredited by the Western Association of Schools and Colleges and is approved by the California Department of Education for the training of veterans under the provisions of the G I Bill of Rights.

ABOUT THE TRAINING

Training of marine technologists at SBCC began in 1968 with financial sup-

port from the National Science Foundation and the related Sea Grant Program. Grants from marine industries regularly using the services of divers also helped the program develop the present concept of in-depth, hands-on student training. Perhaps in no other field have such radical changes in equipment, tools and techniques developed as fast as they have in diving. Diver training had to keep pace with those changes.

The greatest challenge in training commercial divers was to provide qualified persons trained to work at greater depths. In the past, a deep dive for a commercial diver was to 100 feet. Almost no work was attempted deeper than 200 feet. Mostly this was because there was no need for a diver to go deeper. Diving to depths in excess of this, rarely and usually in connection with the recovery of treasure, was accomplished with what were then called articulated dive suits. Today, they are dubbed one atmosphere diving rigs and have names such as JIM, SAM or WASP.

Offshore oil exploration and production started from barges sunk in 20 or so feet of water to offer a stable platform for the drill rigs. Marine construction of underwater pipelines was to depths of less than 100 feet. Ship salvage was limited to 60 feet or so; perhaps to a depth of twice that for certain types of cargoes. All diving was done with compressed air and full helmet and diving dress.

Today's offshore oil exploration and development takes place as deep as 300 feet with jack-up rigs; as deep as 300 to 2,000 feet for semi-submersibles and drill ships. When needed, and it frequently is needed, diving will be with the new lightweight helmets and either drysuits or wet-suits to about 200 feet. To 600 feet or so, a mixture of helium and oxygen will be used as a breathing gas. Mixed gas saturation diving will be used in excess of 200 feet to perhaps 1,000 to 1,200 feet. Atmospheric dive suits (ADS) or remotely operated vehicles (ROVs) will be used at depths in excess of this.

The complexity of such diving is almost unimaginable. And, at SBCC MDT students must not only understand these complexities they must be able to physically demonstrate they can work their way through them to complete even the most complex dive mode: a deep water saturation dive.

A SAT DIVE

Let's go back to the two divers on the 25 day saturation dive. We will assume they completed their SBCC training and were employed by an offshore oil company off the coast of California. The work barge is moored over the production system, 505 feet below. As you go aboard you will see, in the after section, an elaborate array of equipment. The principal parts of this are the multilock deck decompression chamber (DDC) with the

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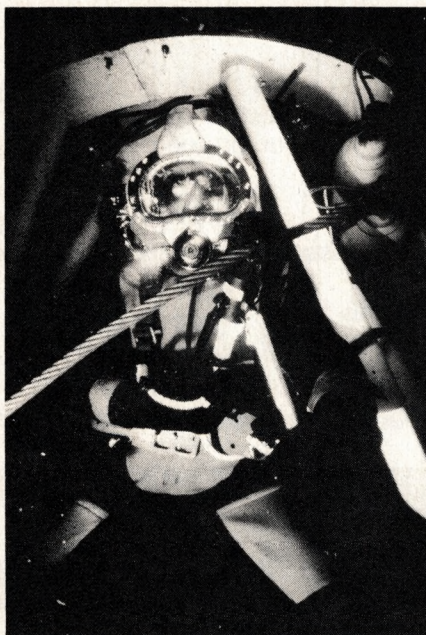
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personnel transfer capsule (PTC) or bell mated to the entry hatch of the DDC. Nearby are the environmental control unit (ECU), the main (diver) control van, and, almost hanging over the side, the bell launch system with its long lengths of umbilical. Slightly to one side will be the ROV and launch system and the controls for the ROV. A dozen sat dive personnel are busy checking and double checking equipment, material, umbilicals and tools.

The environmental control unit is the heart of the saturation life support system. It provides heating and cooling wa-



A diver prepares to cut away a cable that has snagged his diving bell. SBCC divers learn to handle any problems that arise.

ter to the chamber for temperature control, chill water for dehumidification and a scrubber for carbon dioxide removal. It also provides chamber circulation to maintain a breathing gas mix. Should there be a failure of any of these systems, emergency or backup equipment, material and procedures are being readied.

In the main control van the dive supervisor, dive planner and probably a representative of the company will be busy monitoring gauges, operating telephone communications with the divers and scheduling the compression and decompression profiles.

In the DDC the two divers, at atmospheric pressure but already fully outfitted for their dive, are busy storing gear, including their 80 foot umbilical, in the PTC or bell.

On deck, winch crews man the bell and the ROV launch systems. Barge crews clear the area for launch of the sat divers.

Now its time to start the dive. Let's follow each major step as outlined in Jerry Clouser's *Commercial Diving Operations*

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Procedures Manual.

(1) Press (the DDC) to 22 feet on air (divers are breathing mixed gases through masks).

(2) Continue pressing to saturation storage depth on pure helium (storage depth is 400 feet for our dive): (a) Environmental control running. (b) Add oxygen to desired level. (c) Keep divers out of upper areas of the system because of stratification of gases. Note: Divers are still in the DDC, which is being pressurized to depth.

(3) Upon reaching sat storage depth (400 feet), transfer divers to the bell (still mated to the DDC and still on deck).

(4) Do a complete inside and outside bell checkout.

(5) Raise entrance lock hatch, hold up on hatch and exhaust 5-10 feet of pressure, keeping a close eye to note when hatch seals.

(6) Close bell inner hatch. Exhaust hatch trunk, keeping close eye on DDC and bell depth gauges, ensuring no loss of depth in either.

(7) When trunk is completely exhausted, unmate bell from DDC.

(8) Hook up drop weights, close outer hatch and inform divers bell is going over the side.

(9) Turn hot water on to the bell: Divers have hot water going overboard.

(10) Advise divers when bell is about to go through the interface (the junction of air and water—turbulence is encountered at this point).

(11) Lower bell, install chain stops every 50 feet on bell umbilical.

(12) On the bottom at work location (505 feet). Divers ready to exit bell: (a) Equalize bell trunk through inner hatch valve. (b) Check hot water temperature in bell. Shift hot water to diver umbilical and close overboard discharge. (c) Diver one leaves bell, proceeds to job, is met by ROV with hydraulic tools, then works on job for two hours. Diver two tends diver one's umbilical from inside the bell. (d) Diver two leaves bell and relieves diver one at job. Diver one becomes tender for diver two. (e) Diver two completes job, except for work that can be done by ROV, and reenters bell. All umbilicals carefully stored in bell. (f) Divers raise and dog lower hatch. (g) Divers then close inner hatch. (h) Hot water shifted to overboard discharge. (i) Press down bell an additional five feet.

(13) Bring bell up; control van personnel closely check internal pressure.

(14) Mate bell to DDC.

(15) Check mate-up device visually before pressurizing trunk.

(16) Pressurize trunk and transfer divers to DDC and decompress to saturation storage pressure of 400 feet.

(17) Divers relax and standby for next underwater job at depth.

There are, of course, many little things that must be done to keep these major functions operating smoothly. The sat dive personnel must see these are



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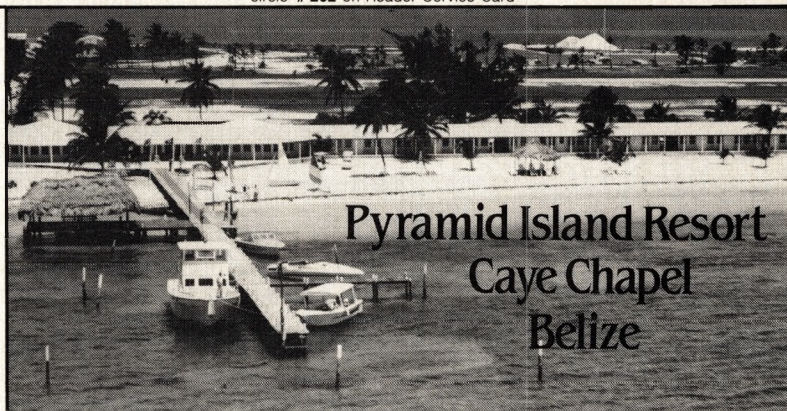
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accomplished in a way that won't jeopardize the job or the safety of the divers.

At SBCC the MDT students will go through at least three saturation dive routines during their training. In the real world of commercial diving there will be no surprises for them on a bell/sat dive. Of course, diving training is not all exciting bell/sat work. There is also a lot of studying to do.

CLASSROOM STUDIES

The most important contributions the two year community college diving training programs make to commercial diving are the peripheral subjects that make for a better understanding of the mechanics and physical aspects of diving. While it is true diving is still hard, often dirty, work, it is no longer simply U/W labor with no thought of what or why the job is done. Commercial diving is a complex job requiring a lot of varied knowledge and skills. The more the diver knows the easier the jobs and advancements will be.

Interestingly, in gaining this special knowledge and in learning how to apply it to commercial diving, students in the SBCC MDT classes spend their first year in classrooms. They learn to make drawings of what they have inspected and translate blueprints into meaningful objects. They find out about the ocean and how it affects their underwater work. And, they learn to better apply the electronic capabilities of an ROV system and how to keep it in operation. Courses in technical writing prepare graduates to present their reports in a manner that is both understandable and interesting to read.

NDT TRAINING

Construction projects built underwater during the past 50 years now need more, and more complex, inspection and maintenance than ever before. This need will continue to expand and diversify as the installations get older and as longer life is expected from those aging projects. Nondestructive testing (NDT) of these marine projects will ensure their safety and usefulness.

Skills in NDT will assist a graduate in a more rapid breakout in commercial diving. In today's offshore oil work, and to a lesser extent in most marine fields, the work of a proficient underwater mechanic is in greater demand than ever before.

UNDERWATER TRAINING

The SBCC Marine Diving Technology program has nearly one-half million dollars in diving and related training equipment. Important training aids are the two, large diameter, 11 foot deep training tanks. For beginning divers, the tanks provide a realistically controlled environment where actual working conditions can be simulated without danger or

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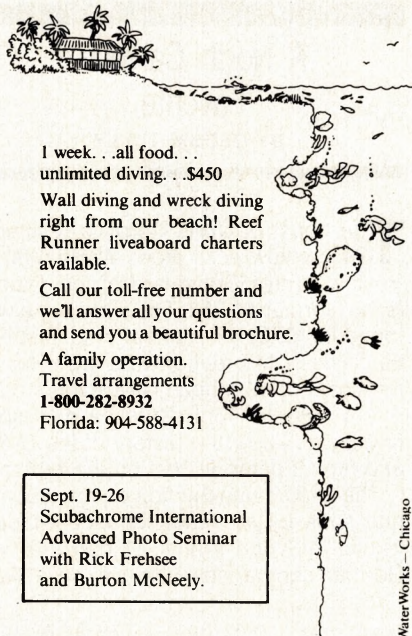
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stress that would detract from the learn-
ing processes. In all training, one of the
major objectives is to prevent students
from developing improper and danger-
ous habits. In the environment of the tank,
where all their actions can be monitored,
such problems can be remedied immedi-
ately. This is very important in U/W weld-
ing and cutting where technique is criti-
cal. Jerry Clouser, and the students too,
consider the dive training tanks the labo-
ratories in which novice technicians de-
velop useful job skills for future applica-
tion in ocean dives.

Another important lesson learned in the
tanks is that divers must work in concert
with their topside support personnel.
There may be one-half dozen trainees
working in a tank at one time on an equal
number of training projects. Topside,
twice that number of support personnel
are busy keeping all of the jobs progres-
sing to completion. This is similar to con-
ditions that could exist on a busy diving
job. "There is a lot of competition among
students," Jerry told me. "In this pro-
gram, almost as much as in real diving,
everybody has to work together."

During all training sessions involving
underwater work, students are alternately
given different job assignments. One day
the student is the diver; on another, the
supervisor; and on still another day, a
technician who handles the mixed gas
and bell systems; or a tender handling a
diver's umbilical. Rotating assignments
teach students operational procedures.

ROV COURSE

In the fall of 1986 the Marine Technol-
ogy Department of SBCC developed a Re-
motely Operated Vehicle (ROV) operator
and technician training course to aug-
ment the diver training program. That de-
partment purchased two ROVs (the Hy-
dro Products RCV 100 and Deep Ocean
Engineering's Phantom 500). Students
who learn to use these vehicles will quali-
fy for observation tasks, bottom surveys,
structural inspections, diver support moni-
toring, activity monitoring and scientific
reconnaissance. They will also learn the
technical aspects of maintenance and re-
pair of all equipment. It is anticipated the
SBCC MDT program will also provide
ROV training for search and rescue units
for police, fire and sheriff's departments.

The RCV 100 is basically an eye-ball
submersible with a depth capability of
330 feet. It also provides constant depth
and digital depth and heading readout,
which can also be recorded on the TV
control monitor. It uses a fiber optics um-
bilical with a pan and tilt color camera
unit. Its principal advantages are small
size, maneuverability and low cost.

The Phantom 500 has a depth capabil-
ity of 500 feet. It is also a much more
powerful system with operational charac-
teristics similar to the larger construction
vehicles used in offshore oilfield work. A

(Continued on Page 180)

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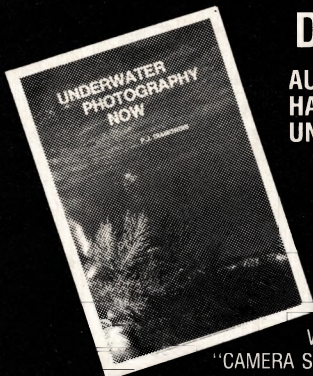
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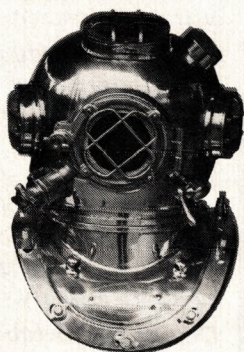
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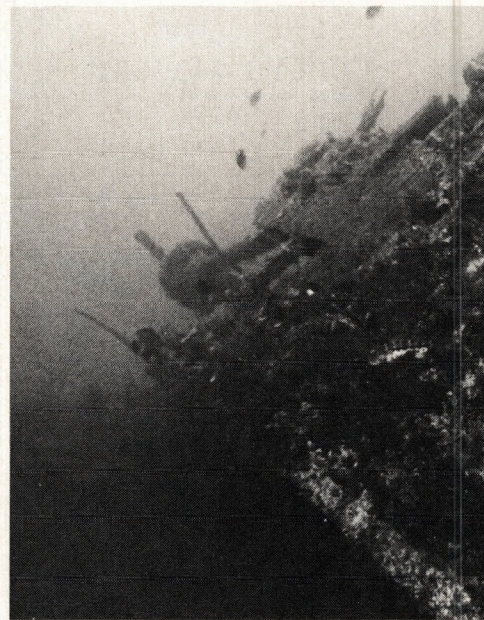
THE U-352

A North Carolina Favorite

BY DEBBIE TULLY

The coast of North Carolina is littered with shipwrecks from World War II. Resting in this Graveyard of the Atlantic is the German *U-352*. The submarine was found in 1975, 43 years after its last battle. It lies in 115 feet of water 20 miles off the coast of Morehead City. Even though it is a favorite North Carolina dive spot, few divers know the history of the *U-352* and how it came to rest on the bottom.

The *U-352* was the first enemy submarine sunk by an American Coast Guard vessel in World War II. During the war, German submarines were sinking at least



two Allied ships a day because no black-out had been ordered along the American coast. All the Germans had to do was watch for the passing ships to be silhouetted against the shore. When the U-boat encountered the *Icarus*, a cutter, on May 9, 1942, both were alone.

The soundman on the *Icarus* heard what he thought was a German U-boat. However, no action was taken until an enemy torpedo missed the cutter and hit the ocean floor next to it, stirring up the mud. The commander of the U-boat, Kapitän-Leutnant Hellmut Rathke, decided the mud cloud would be the safest place to hide. The *Icarus* commander, Lieutenant Maurice D. Jester, dropped charges in a pattern over the suspected area of the submarine. Two depth charges exploded near the conning tower and one

charge exploded on the deck gun and engine room.

Within minutes a huge bubble surfaced, spreading foam in all directions, followed by the slowly rising submarine. The bow came up out of the water at a 45 degree angle and the sailors were ordered to evacuate. When the Germans started scrambling out onto the bow coast guardsmen opened fire upon them from the deck of the *Icarus*. Fourteen Germans were killed.

When Jester realized the Germans were surrendering he ordered a cease fire and picked up the 33 survivors. After the Germans were captured and brought aboard the cutter, both crews actually got along well, exchanging jokes and war stories, trying to bridge the language gap. Rathke nevertheless remained aloof because the *Icarus* had opened fire upon them while evacuating. When Jester turned the prisoners over to navy officials, the coast guardsmen wished luck to Rathke and his men, but no one aboard the *Icarus* ever heard anything of the Germans after they were taken away.



The U-352's anchor capstan mechanism shows heavy encrustation and corrosion.

removing all torpedoes except one, which was sealed off. No more human remains were found and the bones originally brought up were sent to West Germany. The Jacksonville dive shop that displayed them is no longer in business.

Today all hatches are open to the public with the exception of the one containing the torpedo and there is very little danger of explosion as long as it remains sealed. The run out to the site is about 26 miles, or two to three hours, with charters leaving from Beaufort, Morehead City, Swansboro and Jacksonville. The Olympus Dive Shop in Morehead City has many of U-352 artifacts on display.

The bow of the sub is pointed on a heading of 50 degrees and the boat lists to the starboard about 40 degrees. The exposed propeller and deck gun are gone. The deck gun was blown off when the boat was sunk and the propeller was salvaged. Much of the deck and outer ship are gone, but divers can see the frame and the crew quarters are still intact. The inner pressure hull is also still intact. The conning tower extends ten feet over the hull with most of its metal covering gone. The conning tower hatch, forward and stern torpedo loading hatches and galley hatches have all been removed so most of the inner chambers can be explored by sport divers.

Most of the hydrocoral, sponges and other marine life have been removed by divers over time but there are many game fish and bottom dwellers such as groupers, flounders, sheephead and spadefish. Although the temperature stays in the 70s (°F) during the summer, it is advisable to wear a wetsuit to prevent getting chilled. Visibility ranges from 50-100 feet. Because of the depth of the sub and the 15 minute bottom time limit the U-352 should only be dived by experienced wreck divers. The U-352 and other North Carolina wrecks give divers a chance to relive a small part of American history. 



photos/Rod Farn

This photograph shows the state of deterioration in the outer shell of the U-352.

After the wreck was discovered, there was some controversy over sport divers bringing up remains of the U-352 and its crew. When a Jacksonville, NC dive shop started displaying bones in order to advertise its boat trips to the wreck, both Europeans and Americans alike were horrified. At the same time, divers were saying there were live torpedoes and other ammunition left on the wreck. The West German government then claimed the site as an unmarked war grave and gave permission to the U.S. Navy to make a search of U-352. U.S. Senator Lowell P. Weicker dived on the wreck, confirming there was live ammunition on it. The navy made many dives on the sub,

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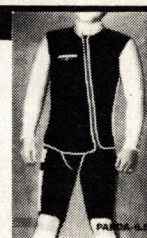
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Triview Package
We have combined the most popular equipment in this super package * Silicone Triview mask with tempered glass, and double seal * Blue bore snorkel with silicone mouthpiece * Open heel adjustable vented fins. Ideal for SCUBA and snorkeling. Retail \$125.00

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With ABC, U.S.TECH, or Shadow packages in this ad.

One tank per package.



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Quality equipment at an unbelievable price * Rubber vented fins with adjustable strap * Rubber mask with tempered glass and double seal * Big bore snorkel. Great for SCUBA, skin diving, and vacation!

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ABC Deluxe Package
We have combined gear from the best: U.S.TECH Advanced Buoyancy Compensator (ABC) with rapid exhaust, power inflator, adjustable sides, waist support band, large pockets, back pack, and attractive colors (full two year warranty) * T-2100BX Tekna regulator with balanced piston first stage and ultra light weight second stage (one year warranty) * U.S.TECH Datacom II console with pressure, maximum depth indicating depth gauge, and built-in thermometer with full lifetime warranty (see April '87 Skin Diver review) * U.S.TECH Sport octopus with yellow cover, silicone mouthpiece, and 36" hose and full two year warranty. Color coordinated with Pink, Turquoise, or red. Retail \$1015.00

Sale \$595.00



U.S.TECH Package II
A complete package from one of the premier names in diving equipment! Included are: The B-29 Jacket buoyancy compensator featuring rapid exhaust, power inflator, adjustable sides, large pockets, back pack, and waist support band, and lifetime bladder warranty * The Ranger regulator with piston first stage and light weight synthetic second stage, silicone mouthpiece, and full two year warranty * Sport second stage with yellow cover, silicone mouthpiece, and 36" hose, with full two year warranty * Datacom Double console with pressure and depth gauges, with full lifetime warranty (featured in April '87 Skin Diver). Color coordinated with Pink, Turquoise, or red. Retail \$780.00

Sale \$435.00



Shadow Package II
For the diver who likes discrete, top quality equipment, we present some of U.S.TECH's best * The Shadow jacket BCD - all black - with rapid exhaust, power inflator, waist support band, back pack, pockets, side adjustments, and more (full two year warranty) * Vanguard Professional regulator with high performance first stage and professional second stage with silicone mouthpiece (full two year warranty) with SCUBA Guard case (reviewed in Jan. '87 Skin Diver) * Sport octopus with 36" hose (full two year warranty) * Datacom console with pressure and depth gauges, with full lifetime warranty. The choice of professionals. Color coordinated with Pink, Turquoise, or red. Retail \$980.00

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Heuer Black Coral Watch

The most popular watch we have ever sold! Features include Quartz movement, date, rotating ratcheted bezel, scratch resistant crystal, two tone black and gold body and bracelet, expandable to fit over wet suit! Looks great, and is priced right! Mens 980.029 Womens 980.028. Retail \$445.00

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Books

Underwater Video, Dick Jacoby	\$14.95
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The Decompression Workbook	



Datacom II Console
Reviewed in April Skin Diver Magazine, the Datacom II Console is one of the most unique high quality consoles available. Color coded for clarity, with large easy-to-read numbers, full luminous faces, and heavy duty housing. The only totally complete lifetime warranty in the industry! Pressure gauge with built in thermometer, depth gauge with maximum depth indicating needle, and no-decompression tables on back. Retail \$220.00

Sale \$119.95



Scuba Equipment Care Video

New! Learn how to assemble your equipment, and the ins and outs of correct care, storage, and transportation. This video tape covers regulators, BCD's, suits, accessories, gauges, tanks, valves, snorkeling gear, and more! We'll show you how to clean your gear correctly, and basic equipment "first aid". The tape was designed and written by diving technicians and service people! Beta, VHS, or 8mm **\$29.95**



U.S.TECH Sport Octopus

This octopus is constructed from a light weight composite that will stand up to the harshest conditions. Resistant to chemicals, debris, and corrosion! The Sport Octopus includes a 36" long hose, bright yellow second stage cover, and silicone mouthpiece. The housing is warranted for life, parts and labor for two years. From the diving innovators at U.S.TECH. Retail \$115.00

Sale \$59.95

How To Order: Call Berry Scuba Co. at (312) 763-1626. Have your charge card and order ready. We can also answer questions and give expert assistance! We accept Visa, Master Card, Discover Card, American Express, and PADICard. For orders only, call (800) 621-6019. This is our computer order phone, so no questions can be answered. **By Mail:** Send your order, along with charge card number and expiration date, or Certified Check, Money Order, or Cashiers Check to Berry Scuba Co., 6674 Northwest Hwy., Chicago, IL 60631. Include the required sizing information (Height, weight, chest for BCD's, foot size for fins). **Caution: Only certified divers should use SCUBA equipment. Obtain qualified instruction before diving.**

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Chicago, IL 60631
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Supreme Package
The best of Sherwood! The Freedom advanced BCD with power inflator, cummerbund, rapid exhaust, back pack, pockets, and more * The unique Oasis regulator that keeps your air moist * Shadow octopus that attaches to the power inflator. Also includes octopus with silicone mouthpiece and 36" hose, and double console with PSI, and thermometer, depth with max. depth indicator, and your choice of a 50, 65, or 80 cubic foot tank with K valve and boot * Color coordinated. Retail \$1350.00

Sale \$769.95



Deluxe Package
Just what you need at a great price! Sherwood's Freedom Advanced BCD with power inflator, rapid exhaust, pocket, more * Brut Regulator with light weight second stage. Also includes octopus with silicone mouthpiece and 36" hose, pressure gauge, and your choice of a 50, 65, or 80 cubic foot tank with K valve and boot * Color coordinated. Retail \$900.00

Sale \$529.95



Freedom II Package
This is one quality package! We start with the Freedom advanced BCD with power inflator, cummerbund, rapid exhaust, back pack, pockets, and more * Add the Magnum II regulator with sealed first stage. Also includes octopus with silicone mouthpiece and 36" hose, and pressure depth console, and your choice of a 50, 65, or 80 cubic foot tank with K valve and boot * Color coordinated. Retail \$1250.00

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Iron Clad, Money Back Guarantee

Vanguard Professional Series



Professional Second Stage
Stylish and sleek. Available in a variety of colors, in silicone and rubber. Features a special no-leak exhaust system. Lifetime housing warranty, two years parts and labor.

Comfort, reliability, and style are the words that best describe the *Vanguard Professional* regulator. From its compact balanced first stage, to the sleek, downstream second stage, the *Vanguard Professional* is diving technology at its best. From the first breath you will know that you are using the best. The U.S.TECH *Vanguard Professional* features a compact balanced piston first stage that is designed for the most demanding diver. The high performance first stage features triple chrome plating, marine brass and stainless steel construction, a 4000 PSI working pressure, and environmental design that stands up to silt, sand, and debris.

The second stage body is constructed from triple chrome plated marine brass, and uses several industry innovations. A special pendulum weight rests against the exhalation valve to prevent water entry while upside-down. For maximum air flow, a special air injection port directs the air flow. The second stage top is flexible, and acts as an extra large purge button - great when wearing mitts. The top and exhaust deflector are available in black rubber or in silicone. The silicone version is available in Ice Blue, Yellow, Pink, Lavender, and Turquoise. The professional octopus is identical to the Professional second stage, except that it has a 40" hose, and is available only in yellow.

For more information on the *Vanguard Professional* see January 1987 Skin Diver's review of the *Vanguard* on pages 148 and 149.



Vanguard First Stage
Compact, balanced, and environment resistant. Features four low pressure ports on a swivel, and two high pressure ports. Lifetime housing warranty, two years parts and labor.

Vanguard Professional Silicone regulator. Exhaust deflector and cover available in ice blue, lavender, pink, yellow, or turquoise. Includes Scuba Guard padded carrying case. Retail \$360.00

Sale \$229.95

Vanguard Professional regulator with black rubber exhaust deflector and cover. Includes Scuba Guard padded carrying case. Retail \$325.00

Sale \$209.95

Vanguard Professional octopus with 40" hose, yellow silicone cover and exhaust deflector. Retail \$175.00

Sale \$99.95

About the guarantee: U.S.TECH is so confident that you will love the *Vanguard Professional* regulators, that they are offering a **MONEY BACK GUARANTEE!** Use it. You have 30 days to put the *Vanguard* through it's paces. If you are not absolutely satisfied, return it. We will gladly refund the product cost. What are you waiting for? Try the *Vanguard* now!

How To Order: Call the U.S. distributor of U.S.TECH, Berry Scuba, at (312) 763-1626, or the U.S.TECH order line (800) 942-5301. Use your Visa, Master Card, PADICard, Discover Card, or American express. By mail, send your order to: Berry Scuba, Iron Clad Guarantee, 6674 Northwest Hwy., Chicago, IL 60631. Use your credit card, money order, or certified check. If you need more product information, ask for our U.S.TECH Sheet. Warning: Only certified divers should use items in this ad.

The Ultimate In Diver's Apparel - From Berry Scuba



Step-in Jacket



Step-In Shorty



Cold Water Hood
Cold water hood features bib and is 1/4" thick for maximum warmth. **\$24.95 With Plush lining \$32.50**

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The best for maximum dexterity and comfort. Available in 1/8" or 1/4" thicknesses. **\$24.95**

Regal Farmer John
Our special *Regal Farmer John* wet suit is constructed from *SuperFlex™* material for maximum in comfort and fit. Features include knee pads, Velcro brand shoulder closure in Farmer John bottoms, over-edges, and triple glued seams. Extra warm step-in style jacket can be used alone or with suit. Stylish tri-stripe fashion stripe down sides, and contoured cut, add to the *Royal's* already great looks! 1/4" thick, Plush lined. Retail \$295.00

Sale \$199.95

Royal Farmer John
This fashionable suit is designed to be color coordinated with your BCD, tank, or other equipment. Available in three striking color combinations (black with red, black with pink, black with turquoise), the *Royal* is constructed from 1/4" thick *SuperFlex™* material, and is Plush lined for maximum fit and comfort. Step in jacket, Velcro brand closure in Farmer John shoulder, knee pads, over-edges, and triple glued seams make the *Royal* a bargain! Retail \$315.00

Sale \$209.95

Pisces Shorty
Great for the Caribbean, pool, or your favorite warm water dive spot. The *Pisces* shorty is Plush lined, over-edges, and triple glued for maximum strength and durability. Contoured cut and *SuperFlex™* material make the *Pisces* a dream to wear. Top quality construction, the best material, and an unbelievable fit! Fashion tri-stripe makes this shorty easy to color coordinate with your other equipment! Retail \$185.00

Sale \$97.50

How To Order: Call Berry Scuba Co. at (312) 763- 1626. Have your charge card and order ready. We will also need to know your height, weight, chest, and waist measurements. We accept Visa, Master Card, Discover Card, American Express, and PADICard. **By Mail:** Send your order, along with charge card number and expiration date, or Certified Check, Money Order, or Cashiers Check to Berry Scuba Co., 6674 Northwest Hwy., Chicago, IL 60631. Include the required sizing information. **Add \$10.00 for XXL suits, \$20.00 for XXXL suits.**



Whale's Eye Photo

"Great for travel, storage, and protection. The Whale Bag is a diving companion no diver should be without" Dick Jacoby

Video Tapes - Beta, VHS, 8mm - \$29.95 each
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Make sure your valuable equipment remains in top condition. Dick Jacoby demonstrates regular servicing, care of batteries, lenses and electronics. Even learn to put your camera in working order if water gets in.

Nikonos Use Tape

Sit back and learn how to use Nikonos equipment with this complete tape. Assemble Nikonos, strobe, accessories. See setups and resulting shots that make picture-taking easy. Shows how to use extension tube, close-up kit, 35mm, 28mm, 20mm and 15mm lenses.

Whale Bag



Perfect all-round gear carrier - holds everything from cameras to scuba to clothing - with protection! A full 1 1/4 cubic foot interior fits your gear under the plane seat, carries it out on the dive boat. High impact foam inside. Complete with handles, shoulder strap, saddle bag, and side pocket. Dupont Cordura® Nylon. 10"x13"x18". **\$69.95**



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There's no filter like it! The *Whale Sharpeye* brings out reds and oranges of sunlight at unheard of depths. To 50 feet with slide film, 80 feet with color print film. Attach it to your video camera for unbelievable color to at least 80 feet. With its special ultraviolet inhibitor, images are sharper and more colorful. 58mm \$49.95 52mm \$47.95

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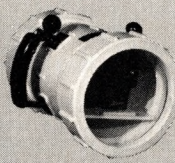


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SBCC

(Continued from Page 173)

number of these models are currently being used in offshore pipeline inspections and in support of drill rigs.

Students qualifying in the many uses of these units will add important and desirable skills to their work capabilities and improve their job prospects.

SCOPE OF TRAINING

Marine technology is basically an understanding of the sea and the ability of the marine industry to adapt its tools, equipment and techniques to problem solving in the marine environment. Courses at the marine tech department of SBCC prepare students primarily for work in the commercial diving industry. However, the scope of training is such that many other marine oriented job potentials are covered. What SBCC has found in past years is that some students are oriented toward vocational aspects of diving, i.e., to marine technology. Other students are more interested in the marine sciences. Also, some students seem



photo/Christopher Swann

SBCC student Susan Schneider at the operating console of an ROV system.

to be lost in a middle ground, unsure of where they want to go. The marine diving technology program is broad enough that all students who enter and complete the courses will find a profit oriented place in some facet of diving.

Marine Technology Department chairman Jerry Clouser told me, "We try to look at all marine technology programs and update them. This includes forming new programs to train diving medical technicians as well as qualified graduates to teach scuba and to run diving shops."

Jerry enlisted in the U.S. Navy in 1961. He left the navy and started commercial diving in 1968 and, one year later, enrolled in Edmonds College in the State of

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PACKAGE DEAL "A"

B-30 BCD JACKET with power, soft band pack, rapid
exhaust, cummerbund; high performance sport
REGULATOR with 36" hose OCTOPUS and limited
lifetime warrantee; Tekna pressure and max-depth
DOUBLE CONSOLE.

Retail 765.00 elsewhere
CENTRAL SPECIAL \$460

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PACKAGE DEAL "B"

DEF ADVANCED BOUYANCY COMPENSATOR with
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Tekna 2100 BX REGULATOR with ultra lite servo
second stage and 36" hose OCTOPUS with limited
lifetime warrantee; pressure and max-depth
DOUBLE CONSOLE WITH THERMOMETER.

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PACKAGE DEAL "C"

Black BCD BOUYANCY COMPENSATOR with power and
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hose OCTOPUS with limited lifetime warrantee;
DOUBLE CONSOLE with pressure and depth.

Retail \$760.00 elsewhere
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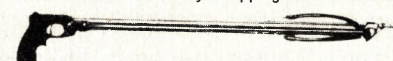
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BUTTON RESERVE AIR TANKS. VALUES TO \$425.

PACKAGE DEAL "E"

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and compass TRIPLE CONSOLE.

Retail \$905.00 elsewhere
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Central Skindivers

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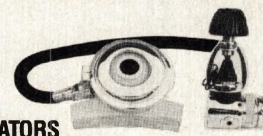
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OCTOPUS (LONG HOSE) (List \$90)	\$49

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DEF ADVANCED BOUYANCY COMPENSATOR with
power, soft band pack, rapid exhaust, cummerbund;
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OCTOPUS and limited lifetime warrantee; pressure and
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Advanced FREEDOM DELUXE BCD with power, pack,
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THE CAPSULE "8" houses Sony's State-Of-The-Art 8 mm "Handycam". It is without a doubt the most compact and lightweight underwater video system available today, from which superior results can be obtained with a minimum amount of instruction and experience.

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THE AQUATICA "3" is shown equipped with the 105 mm Macro Port and a Nikonos V mounted on the accessory shoe.



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Montréal, Canada H4N 1X1
Tel. (514) 336-7051

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SBCC

Washington. He has been teaching at SBCC since 1975 and became chairman of the department in July 1985.

In a reminiscent mood, Jerry told me, "My greatest reward is to see students graduate and find careers in a field of diving they like doing. I feel, and I always tell my students, if you enjoy working in the ocean you will be a success in the field of diving."

For more information contact Jerry Clouser, Department Chairman, Marine Diving Technology, Santa Barbara City College, 721 Cliff Drive, Santa Barbara, CA 93109-2394; telephone (805) 965-0581, ext. 426 or 427.

SEE & SEA/ISLA MIA TO ROATAN

See & Sea Travel of San Francisco is offering a series of Belize to Roatan cruises aboard the newly-remodeled *Isla Mia*. The itinerary will include the top sites of Belize's Lighthouse Reef plus the best diving of the Bay Islands off Honduras, 75 miles away.

The first cruise is August 30-September 10. For further information contact See & Sea Travel, Inc., 50 Francisco Street, Suite 205, San Francisco, CA 94133 or call (800) DIV-XPRT or (415) 434-3400 in California.

PETER HUGHES/NASSAU

Peter Hughes Dive South Ocean in Nassau, Bahamas, will open November 1, 1987. This all new and completely modern facility will be managed by certified NAUI and PADI instructor Harry Ward, presently dive manager of Peter Hughes Dive Bonaire.

Dive South Ocean will feature the latest in dive equipment, custom designed dive boats and total scuba instruction. A complete photo facility, including underwater video equipment, will be available within the first year of operation. Dive South Ocean will offer individual dives and dive packages, as well as complete vacation packages with accommodations at the new Divi Bahamas Beach Resort & Country Club. This new Peter Hughes dive operation is on South Ocean Beach at the West End of Nassau. Here, divers will find the Tongue of the Ocean, also known as the Grand Canyon of the Caribbean.

Reservations and information can be made through recognized travel agents, dive shops or Divi Hotels Marketing, Inc. (607) 277-3484; toll free (800) 367-3484 in the U.S. and Canada.

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1/4" 3/16"

Sex Age

Height

Weight

Ankle

Calf

Knee

Thigh

Hips

Waist

Chest

Neck

Wrist

Forearm

Elbow

Biceps

Ankle to Knee

Ankle to Crotch

Ankle to Waist

Shoulder Seam
to Crotch

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Wrist to Armpit

Hat Size

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BODY SUIT**
Assorted Colors
\$39⁹⁵



**CITIZEN
AQUALAND**
•Depth gauge •660 ft. •Alarm
•Dive timer •Calendar
\$199⁹⁵



**CASIO DEPTH GAUGE
CHRONO WATCH**
•Depth gauge •660 ft.
•Stopwatch •Alarm
•Electronic calendar
\$47⁹⁵



THE MARINER A.D.V.

- By Sea Elite
- Padded back pack
- Padded waist belt
- Tank security plate
- Quick release & adjustable straps
- Padded shoulders & much more
- Limited life time warranty



List \$330.00
Sale **\$189⁹⁵**

SUPER SPECIAL II CONQUEST ADVANCED DESIGN B.C.

- By Sea Elite Systems
- Wrap around tank securing system
- Soft back pack (no hard plastic against your back)
- Padded comfort waist belt
- Many more features
- Limited life time warranty



List \$395.00
Sale **\$199⁹⁵**

SE 2000 HIGH PERFORMANCE REGULATOR

- By Sea Elite Systems
- High capacity balanced regulator
- Double seal piston o-rings
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- 5 L.P. ports & 2 H.P. Ports
- Colors: black, blue, yellow
- Limited lifetime warranty

List \$250.00
Sale **\$129⁹⁵**

TEKNA 2810 CONSOLE

- 2 gauge console w/max depth
- Attached knife

Complete List \$830.00
System Sale **\$449⁹⁵**

Sale **\$128⁹⁵**

The Conquest A.D.V.

- By Sea Elite
- Wrap around tank securing system
- Soft back pack •Padded waist belt
- Rapid exhaust valve & much more
- Limited life time warranty



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- Sea Elite single lens mask; blue, yellow, clear, red.

SEA ELITE

- Sea Elite contoured snorkel with purge; blue, yellow, clear, rose.

BEUCHAT

- Beuchat open heel fin; contact fin comes in black, blue, pink.



\$65⁹⁵

SUPER SPECIAL IV

TEKNA T-2100 BX REGULATOR

- Featuring: Fully Environmentalized 2d Stage, Total Balanced 1st Stage W/2 High Pressure Ports & 4 Low Pressure Ports, Life Time Warranty

TEKNA T-2870 CONSOLE

- This Remarkable Console Has It All: Pressure Gauge, Depth Gauge With Max Depth Indicator, Altitude Compensator, Cobalt Compass, Automatic Digital Dive Timer & Knife.

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- 36 Inch Hose "The Safe Second" Life Time Warranty

MARK V JACKET BY SEA ELITE

- The Ultimate in Buoyancy Control 87" model advanced design. Complete w/ auto inflator, R.E valve, light & knife, Pockets & cummerbund.
- Dive Bag



Only **\$639⁹⁵**

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- Farmer John w/step-in shorty 1/4" thickness. Nylon exterior plush lining.
- Navy blue with silver trim (mans)
- Royal blue with silver (womens)
- Cross zipper in shorty (mans)
- Key pocket (mans)
- French cut (womens)
- All tapered edgus, knee pads, spine pad.



List \$500.00

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ALUMINUM TANK SPECIAL

- With each \$400 purchase you qualify to purchase one tank at \$79.95 customer pay shipping.

\$79⁹⁵

Aluminum tanks 80, 67, 53, cubic ft.

Aluminum Tanks

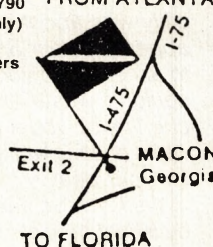
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- Available colors: (navy/silver) (lavender/pink) (turquoise/yellow) (black/royal blue) (black/red)
- Available sizes: extra small thru extra large
- Sale price when purchased individually

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MAGNUM II REGULATOR

- Available colors: (black) (blue) (lavender) (yellow) (pink)

List \$236.00

Sale price when purchased individually

200 FT. TWO GAUGE CONSOLE W/SLATE

- Available colors: (black) (blue) (lavender) (yellow) (pink)

Sale price when purchased individually

Complete List \$711.00 Sale **\$439⁹⁵**

SUPER SPECIAL III

PARKWAY OCEAN JACKET III

- Available colors: black/silver/red navy/blue/silver
- Available sizes: Small thru extra large

List \$330.00 Sale **\$209⁹⁵**

SE 2000 HIGH PERFORMANCE REGULATOR

- By Sea Elite
- Limited life time warranty

List \$250.00 Sale **\$129⁹⁵**

PARKWAY CONSOLE

- 2 gauge with max depth indicator

List \$130.00 Sale **\$69⁹⁵**

Complete List \$710.00
System Sale **\$399⁹⁵**

SUPER SPECIAL I

*ADVENTURE JACKET

- Sea Elite advanced design
- 2 pockets, auto inflator
- cummerbund, limited life time warranty

List \$249.95

*SE 1000 BALANCED REGULATOR

- Rugged, dependable & high performance, limited lifetime warranty

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- 2 gauge with max depth indicator
- Add \$49.95 for SE Octopus 39 inch
- We pay shipping & insurance

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Complete Value \$584.95

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SPECIAL V

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DELUXE SEA CHUTE HTS JACKET

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- Balanced Diaphragm "Turbo Assist"

Sale

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List \$145.50

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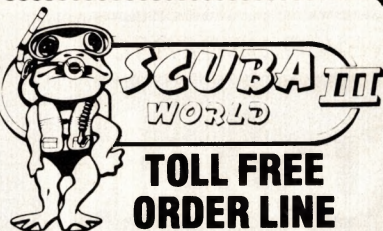
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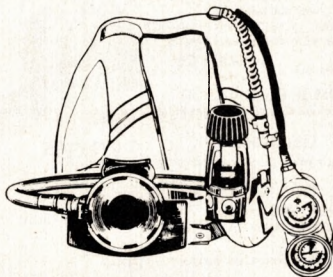
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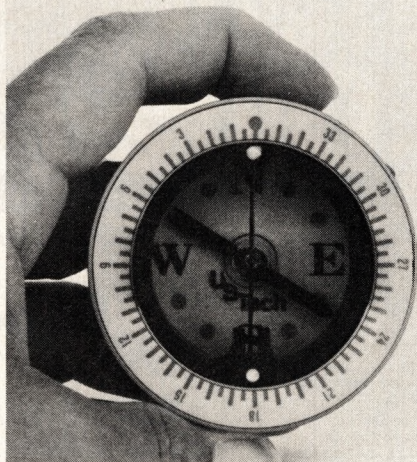
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mail order.

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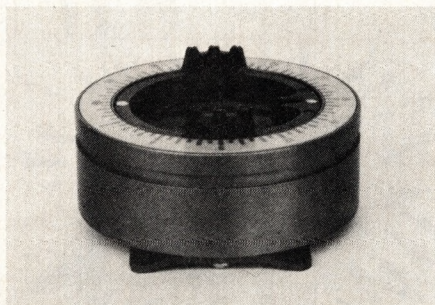
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BY JIM WALKER

You didn't plan on doing any navigation underwater. Your charter boat anchored on a wreck in 80 feet of water and you knew you'd never be more than 50 yards from the anchorline. Besides, your buddy had a compass. All went well until the current came up. All of a sudden the moving water was full of plankton and full of silt stirred up by other divers. Visi-



The large protrusions on the bezel of the U.S. Tech compass make rotation easy.

bility was about 15 feet, your buddy disappeared, your SPG indicated it was time to ascend and you were disoriented. You couldn't waste time looking for the anchorline so you swam to the surface and, while floating along in the current, looked for your boat.

Well, you've seen your boat. Your buddy is just now climbing onto the dive platform. The only problem is you're 100 yards downcurrent and moving fast. You've got a choice: hope for a pickup or battle the current—all for lack of direction.

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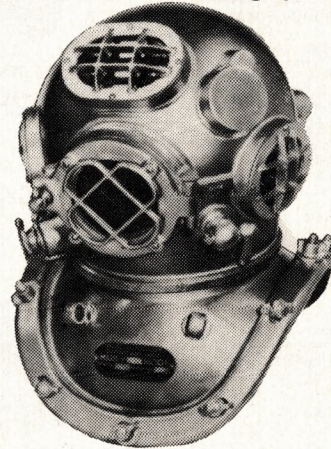
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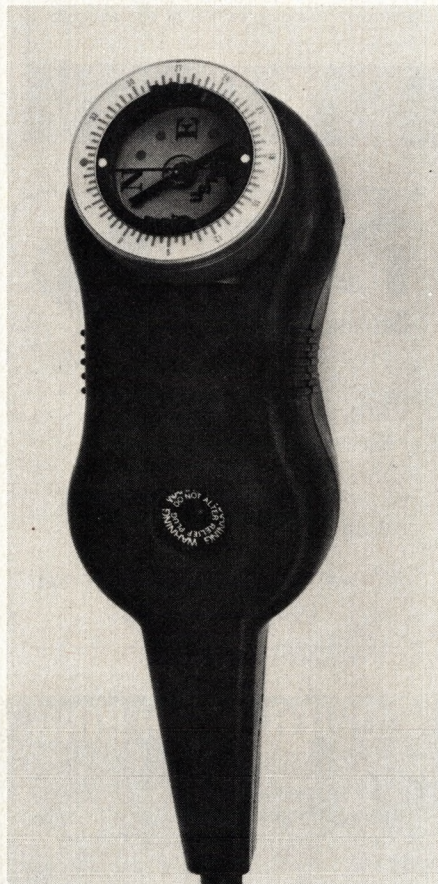
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A compass is not just something for an underwater survey crew and not just an interesting accessory. Having one on your dive is always helpful and often vital. Whether it's used just to find that lobster den you want to return to or to find shore at night in a sudden fog, a compass can tell you where to go.

U.S. Tech's version of this valuable instrument is unique in this age of plastic everything: It's made of aluminum. Light-



The compass is available in a wrist mount or with an attached slide (left) that allows it to be inserted in the U.S. Tech console.

weight and extremely rugged, the two and one-quarter inch diameter, one inch thick U.S. Tech compass has an attractive, light blue anodized finish. It is oil filled and available in a rubber mount with a nylon wrist strap or with a track designed to slip into the back of the U.S. Tech console.

The U.S. Tech compass is designed for easy reading—even in dim light. The face is luminous and displays the four directions prominently, along with large dots at ten degree increments. The compass needle is wide and easy to see and there is a lubber line inlaid on the Lexan lens. The degrees of heading are marked in 30 degree increments around a raised, luminous collar, with indicator marks every five degrees. This collar protects the lens from scratches.

The compass has a rotating bezel with luminous dots at the "to" and "from"

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~~219⁹⁵~~

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BC JACKET** ~~189⁹⁵~~



**PARKWAY
ATLAS
BALANCED
REGULATOR**

~~109⁹⁵~~



**US SCUBA
PROFESSIONAL
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80 cu. ft.
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GAUGE COMBO
- BC JACKET
With Power Inflator

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B C JACKETS

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Combo CPG & Oil Filled
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with Max. Depth Indicator

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POWER FIN**
Open heel vented fin

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POWER FIN**
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REEF BOOTS Super Stretch Nylon with
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3/16" or 1/4" — Sizes 5-12

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BUY 6
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Wraparound Mask allows
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Double Feather-edged seal.



BLACK RUBBER **19⁹⁵**

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With swivel mouthpiece
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With swivel mouthpiece
SILICONE w/ Blue Tube **13⁹⁵**

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**DELUXE
EQUIPMENT
BAG**

Heavy-Duty Waterproof Nylon
with padded handle, two end and one
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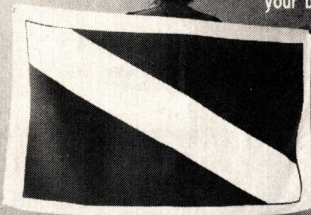


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U.S. TECH COMPASS

headings. At the "to" heading, it also has a cutout that matches the pointed end of the compass needle. This should eliminate any confusion as to which is which. Two large protrusions on the bezel allow the diver to move it easily with gloved fingertips, yet the bezel has enough friction to resist being moved accidentally by bumps and bangs.

As with all U.S. Tech gauges, the compass comes with a lifetime original owner warranty against defects in materials and workmanship. Presently, it is only available (\$50) from U.S. Tech's distributor, Berry Scuba, at P.O. Box 31531, Chicago, Illinois 60631; (312) 763-1626.

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Complete details and reservation information can be obtained by contacting the office of *Coral Star*, 5818 Green Falls Drive, Houston, TX 77088, or call toll free (800) 433-DIVE. Texas and Canadian residents may call collect (713) 999-1463. ➤

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Technifacts

BY E.R. CROSS



Articles in SKIN DIVER are frequently thought provoking and elicit questions and comments from readers. Periodically, Technifacts responds to those who write us.

JEWELS OF THE ATOCHA

"When I received my October (1986) issue of SKIN DIVER I immediately turned to the article, Jewels of the Atocha. In it, two methods were mentioned to retrieve the treasure. While the mailbox device was described, the other, an airlift, was not. I have noticed in several articles in SKIN DIVER, including the Atocha story, mention of this device. Could you answer the following questions?

1.) What is an airlift and how does it work?"

An airlift has a large pipe and a small pipe. The lower ends of both are submerged into the material to be pumped, such as a cargo in a vessel or, in the case of the Atocha, the ocean bottom. Compressed air is then pumped through the small pipe into the lower end of the larger pipe where it mixes with water and rises rapidly. This creates a powerful suction that pulls water mixed with the surrounding material into the larger pipe and discharges it topside into a container or strainer. The large pipe can be as small as about four inches in diameter and as large as 16 inches; the diameter used depends on the size of the material to be pumped. The larger the main discharge pipe the more air required and, therefore, the larger the diameter of the air supply

pipe leading to the bottom end of the suction pipe.

2.) "How long have airlifts been used by divers?"

The earliest reference I find to an airlift is in a book on compressed air engineering published in the late 1800s. Airlifts would not predate the invention and development of air compressors, which were brought into use about that time. The compressor used to produce the desired effect in an airlift must be capable of delivering at least 40 psi over the pressure of the surrounding water (about one-half psi per foot of depth). The volume of air required depends on the size of the discharge pipe and the depth of water.

3.) "Who manufactures and/or markets the airlifts?"

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- Calendar, 12/24 hour time
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- 3/4 oz. case/band



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TECHNIFACTS

Airlifts are so simple to make they are invariably custom-made for a specific job. Basically, any length of pipe of suitable diameter can be used as the suction pipe. The top end of the discharge pipe is usually fitted with a 90 degree elbow and a short length of pipe to move the pumped material away from the site or into a barge or strainer where material is sorted and recovered.

Newman C. Smith, II, of Broussard, Louisiana, concludes his letter by asking:

4.) "What other methods are there for retrieving lost or sunken artifacts?"

Airlifts can be, but usually are not, used to recover artifacts. They are used primarily to remove overburden, such as sand, silt, etc., that is found covering artifacts. As soon as the artifacts at the site have been exposed they can be mapped, studied *in situ*, photographed and then recovered by placing them carefully in a suitable cage or on a pallet for hoisting to the surface. Some larger objects can be lifted by the use of flotation bags or by a winch and sling from the surface vessel. Very valuable or fragile artifacts can be carried to the surface separately by divers as were some of the *Atocha's* treasure. Many artifacts could be broken, and possibly lost, by handling with an airlift.

Sport divers, and commercial divers too, should remember that haste makes waste in handling material from an underwater site, whether it is a wreck, drowned habitation area or a collection of fossilized skeletal remains of prehistoric animals. The more information developed about the history of the site, the material and the artifacts themselves, the greater the value of the recovered articles. This is true regardless of the ultimate disposal of the artifacts; i.e., sale, display or study by scientists.

FOLLOWUP ON ARTIFICIAL REEFS

"I am responding to your request for more information on artificial reefs contained in the September 1986 issue of SKIN DIVER. I want to tell you about an artificial reef system originally constructed as a causeway that now serves as a causeway and pier as well as functioning as a refuge for marine life." George R. Thomas, Vieques, Puerto Rico, continued, "The causeway is known as Mosquito Pier and is on the northwest side of Vieques Island."

Vieques Island is a relatively unknown dot of land in the Caribbean. The island lies about six miles off Puerto Rico's east coast. It is only 21 miles long by no more than five miles wide. A good two-thirds of Vieques is occupied as the U.S. Naval Reservation and Naval Base and the U.S.

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Marine Corp's Camp Garcia, which includes an extensive training and maneuvering area. In addition to the military there is a population of about 7,800 Spanish speaking people on the island.

Within the Naval Reservation the Mosquito Pier, a manmade wonder, juts more than one mile into the ocean. The pier was once used to load sugar cane for transport to the main island. It is now used by the Navy to bring supplies to Vieques from the base at Roosevelt Roads.

Here is what George Thomas says about the sport diving along the pier. "The pier is built entirely of huge boulders with a top of gravel and asphalt. It also serves as a breakwater and the water is calm along its western side. The depth varies from one foot near shore to almost 40 feet at the seaward end. The ocean bottom along the seawall is covered with short grass (algae), interspersed with bare sandy areas and an occasional old auto tire. In between the large boulders are cavernous spaces that serve as refuge for many forms of marine life: trumpetfish, sand divers, cardinalfish, squirrelfish, drums, butterflies, spadefish, angelfish, damselfish, gobies, wrasses and many others. One scorpionfish is occasionally seen but usually stays hidden."

Later in his letter, Thomas stated, "Larger fish such as barracudas, jacks and other predators, including, rarely, a shark, cruise by looking for a meal of smaller fish. Visibility varies from 15 to 40 feet and the water is warm year-round."

Being a snorkeling purist, George said, "The only way to see and enjoy the abundant marine life along the pier is to use a snorkel." He added, "I have only described the western side of the breakwater. The eastern side is simply too rough. We have hurricanes here but this old stone breakwater/artificial reef will survive for a long time."

While not intended as an artificial reef, a breakwater/pier constructed of very large boulders provides important habitats for many marine life forms. Since the marine life can find refuge from all predators, including humans, the reef repopulates surrounding areas as well.

STATE LAWS/ SUNKEN VESSELS

Thomas Haynie, Reedville, Virginia wrote stating, "I am interested in learning the individual state laws governing underwater search and salvage. The states I am interested in are Florida, North and South Carolina, Virginia, Maryland and Delaware. Can you help me?"

For Virginia, write to Research Center for Archaeology, Commonwealth of Virginia, Route 238, P.O. Box 368, Yorktown, Virginia 23690.

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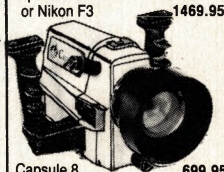
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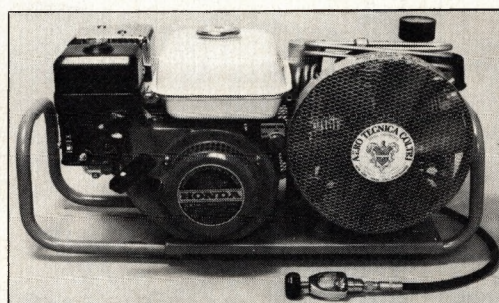
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TECHNIFACTS

right, Underwater Archaeologist, Institute of Archaeology and Anthropology, University of South Carolina, Columbia, SC 29208. This state has an interesting hobby license issued to sport divers who wish to search for and recover underwater antiquities on a non-commercial basis and under a mutual benefit plan with the state. It is one of the more practical plans.

For Florida, write to Division of Archives, History and Records Management of the Department of State, Tallahassee, Florida. Florida will also enter into a contract with qualified organizations in wreck salvage.

At this time I have no information on state laws for Delaware or Maryland. It is suggested you write to the state capitals. Your local library should be able to provide addresses.

CORRECT MAILING ADDRESS

Some readers who wrote to the National Association of Diving Medical Technicians had their mail returned. The correct address, as confirmed by a recent telephone call, is c/o The Ocean Corporation, 5709 Glenmont, Houston, TX 77081. My thanks to Jim Joiner of The College of

Oceaneering, Wilmington, California for this information.

NEED INFORMATION

Can a reader supply the address of the International Journal of Nautical Archaeology and Underwater Exploration? Does the office of publication still exist?

NEW BOOK

The new book, *Stress and Performance in Diving*, is a book whose time has certainly come. For too many years the various aspects of safe diving discussed in full in this book have been touched on only peripherally, if at all, in dive classes and by other authors. All diving—commercial or military—is stressful to some extent and more so for some than for others. This alone should warn instructors and diving supervisors that stress in their divers must be recognized, accepted and then acted on for safety. If this 180 page book is used by divers, diving supervisors and diving physiologists to achieve those ends, all diving will be safer and probably more enjoyable.

Stress and Performance in Diving was written by Drs. Arthur J. Bachrach and Glen H. Egstrom. Both are avid, experienced divers, scientists and skillful writers. They are also well qualified educators and hyperbaric biomedical specialists. Probably no other two people are as well qualified to write on this subject.

With more than one million active sport divers in the United States, loss of control leading to panic is probably the leading contributor to scuba diving fatalities. How to recognize and control the kinds of stress that lead to panic is the focus of this new book. The prevention of diver panic is discussed in the introductory chapters. These are followed by other facets of diving stress that affect a diver's safety and performance. Individual chapters deal with research in engineering and physiology that will prepare a diver for a broader understanding of these important aspects of diving.

The many signs of stress, from lagging back while preparing for a dive to the can-do-unto-death syndrome of divers who will not accept the fact they cannot perform a certain feat, are discussed primarily from the point of recognition as syndromes of stress.

To me, one of the most important aspects of the book is the emphasis placed on training—even to the point of over-training—to instill proper, safe reactions to stressful situations. Instructors should read this book, study it carefully and then redesign their training programs to produce students who can recognize and cope with underwater stress. Such programs will save lives.

The book is available from Best Publishing Company, P. O. Box 1978, San Pedro, CA 90732. The price is \$26.50 plus \$2 for postage and handling.

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Savor moonrise & palms at your 60' dock! 1 BR./1 BA., living room,
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in area. 5 mi. to Pennekamp. Great ambiance! \$395 per week.

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Dive Looe Key, #1 Reef in FL. Keys, full service shop.
Dive/lodging packages, custom boats.

BOOG POWELL'S ANGLER'S MARINE 305/296-8504
U.S. 1 Mile Marker 5, Key West, FL 33040
Dive trips, snorkel, rental boats and
rental dive gear, air.

BUDDY'S DIVE SHOP Nat'l. 800/223-4707; FL 800/367-4707
P.O. Box 409, Islamorada, FL 33036 MM 79.5 305/664-4707
Dv. aboard our 40' Scuba Safari & 34' Free 'n Clear. Full/½ day
trips to Alligator Reef, Eagle Wreck & Coral Gardens. Pkgs. avail.

CAPTAIN CHAMBERS CHARTERS 305/451-1805
P.O. Box 2258, Key Largo, FL 33037 MM 100 Dive Pennekamp
30' cust. boat w/sundeck, 6 max. 1 Trip daily, family rates,
brunch served, cust. dv. pkgs. avail. Rec. by Undercurrent '82.

CAPT. CORKY'S DIVERS' WORLD of Key Largo, Inc. 305/451-3200
P.O. Box 1663, Key Largo, FL 33037 MM 99.5 U.S. 1 past Wendy's
Bahamas/Pennekamp. U/W video school/rmts. PADI, NAUI, SSI, instr.
Grp. rates, dive, snkl., sail, windsurf/instr. Best pkg. rates!

CAPT. GREG'S SCUBA-DO 305/451-3446
P.O. Box 2237, Key Largo, FL 33037 MM 100 @ 100 Marina
Dive Pennekamp, 34' Boat, 6 max. No crowds. Personal
Service. Combin. Dive & Fish Trips Avail. Pkg. Rates.

CAPT. SLATE'S ATLANTIS DIVE CENTER 800/331-DIVE
51 Garden Cove Dr., Key Largo, FL 33037 MM 106.5 305/451-1325
Dive Pennekamp on 1 of 4 cust. boats. NAUI, YMCA, PADI, CMAS.
Instr., air & rentals, grp. & multi-dive disc. pkgs., gifts.

CORAL LAGOON RESORT AT THE DIVING SITE 305/289-0121
Deluxe waterfront efficiencies with private sunbeds, gazebos,
dockage, pool, tennis, bikes. PADI dive shop, dive packages.
PADI dive shop, lessons, 3 boats, groups, spring/fall dive pkgs.

DIVE KEY WEST 305/296-3661
"Carol J", P.O. Box 2842, Key West, FL 33045
Disc. room pkg. & grp. rates. Max. 6 divers.
Lobster diving, spearfishing, rentals & air.

FLORIDA KEYS DIVE CENTER 305/852-4599
P.O. Box 391, Tavernier, FL 33070 6 pass. dive boats.
5-STAR facility & dive charters, 4 day instr. & specialties.
Reefs, wrecks, spearfish, Pennekamp & more.

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U.S. Rt. 1, P.O. Box 710, Islamorada, FL 33036 MM 81
Free dockage & boat ramp, waterfront cottage,
rooms with stove & refrigerator, picnic & barbeque area.

HALL'S DIVING CENTER & RESORT 800/331-4255
1688 Overseas Hwy., Marathon, Fla. Keys 33050(in FL) 305/743-5929
Beautiful reef & wreck diving trips-Largest store & instruction.
facility in the Keys—motel/condo diving packages arranged.

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\$65 p.p. dbl. occ. incl. dive w/top shop, equip., overnight accomm.,
Continental bkfst., HBO. Valid thru 12/15/87 (restrictions apply)

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MM 61, Marathon, FL 33050 FL 800/432-2242
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Custom-built dive boats, air/equip. rental, instr., pkg. rates.

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P.O. Box 482, Islamorada, FL 33036 MM 84.5 FL 800/432-2875
All new "Wreck Diving" US 800/327-7070
All new 22 passenger dive boat.

KELLY'S MOTEL AND MARINA 305/451-1622
P.O. Box 75, Key Largo, FL 33037 (MM 104.5)
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On the water/jacuzzi/bqg area/boat ramp/swim/fish/dock/cable/HBO.

KEY LARGO-From Studio apt. to 3 bedroom 2½ bath apt.
Tennis, pool, dockage. Close to all dive shops & boat
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Call 312/357-6285.

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3 bedrooms/2 bath gorgeous, new lushly landscaped private home
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3 BR., 1½ Bath, completely furnished. 305/546-2275
Marina, saunas, tennis, pools, 2 mi. to Pennekamp Park.
Great diving, fishing, sailing. Special summer rates.

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P.O. Box 160057, Miami, FL 33116
2 Bdrm./2 bath, on ocean within Pennekamp Park boundary, ramp,
pool, marina facility, dock, tennis, best security. Weekly, monthly.

KEY LARGO LUXURY CONDO 513/984-0866
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Luxuriously decorated, 2 bedroom, dock, pool,
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KEY LARGO OCEANFRONT APTS. 305/852-5312 or 305/852-9383
On the ocean. Molasses, French & Conch Reefs at your front door.
Large lagoon, boat ramp, minutes to diving/fishing, 2 BR. apts.,
kitchens, all amenities. Weekend, week or monthly rental.

KEY WEST DIVE INC.—CAPT. BILLY DEANS 305/294-0660
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USS Wilkes-Barre. Every dive an adventure.

KEY WEST PRO DIVE SHOP, INC. 800/426-0707
1605 N. Roosevelt Blvd. #A, Key West, FL 33040 305/296-3823
Pro facility, dive packages, O/W checkouts, private instruction.
Coral reef, wreck, ledge, Marquesas & nite dives.

KINGSAIL MOTEL—DIVING RESORT FL 800/423-7474
P.O. Box 986, M.M. 50.5, Marathon, FL 33050 305/743-5246
Complete dive packages, 42' dive boat, dive shop, scuba lessons,
dockage, ramp, pool, complimentary coffee and much more!

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P.O. Box 1157, Islamorada, FL 33036 MM 85.9 800/221-8717
26', 40' & 60' dive boats. Reefs, galleons, wrecks & The Eagle.
Complete pro shop, instruction, packages, photo center.

LOOE KEY RESORT & MARINA 305/872-2215
P.O. Box 509, Ramrod Key, FL 33042 MM27½
40' Glass Bottom Boat, Motel, Restaurant, Dive Shop, Dockage,
Ramp, Pool, Tiki Bar, Diving Inst., Custom Dive & Snorkel Boats.

PENNEKAMP PARK CONCESSION 305/451-1621
P.O. Box 1560, MM 102.5, Key Largo, FL 33037 FL 800/432-2871
The only dive shop located directly in Pennekamp.
Free brochure, send 50¢ for reef chart.

PLANTATION KEY LUXURY CONDO 305/852-5748
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comfortable accommodations and comfortable prices.

SEA DWELLERS SPORTS CENTER	305/451-3640
99850 Overseas Hwy., Key Largo, FL 33037	800/451-3640
Reef trips daily to Pennekamp Underwater State Park.	
Dive package with Key Largo Holiday Inn.	
SEAFARER RESORT MOTEL	305/852-5349
P.O. Box 185, Key Largo, FL 33037 MM 97.8 (Gulfside)	
"Fantasy Island" setting, real, sandy beach, friendly atmosphere, spotless rooms, effs. & apts. at best dollar value plus group rates!	
SEA HORSE MOTEL	305/743-6571
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Dive the best of Pennekamp in "6 Passenger Privacy." Enjoy	
Uncrowded Personal Svs. on Custom Dv. Boats. In FL	305/451-4941.
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STEPHEN FRINK PHOTOGRAPHIC, INC.	305/451-3737
P.O. Box 2720, Key Largo, FL 33037 MM 102.5	800/451-3737
Photo Tours, Instruction, Processing,	
Camera Rentals, Stock Photos, U/W Video.	
THE DIVING SITE, INC.	US 800/634-3935; FL 800/821-9155
12399 Overseas Hwy., Marathon, FL 33050 MM 53.5	
16 & 30 pass. dive boats. Daily reef trips.	305/289-1021
Charters & group rates, PADI lessons, sales, repairs, dive pkgs.	
TILDEN'S PRO DIVE SHOP	800/223-4563
4650 Overseas Highway, Marathon, FL 33050	305/743-5422
Instructor Training Facility/Full service dive shop/	
Daily reef trips or wreck dives/Dive Packages.	
TRIANGLE WATERSPORTS, INC.	305/745-BOAT
Rt. 2, P.O. Box 617, Summerland, FL 33042	305/745-2628
Cust. dv./snork. trips to Looe Key/unique Lower Key reef sites/back	
only expiring. Spearfish/lobster/fish/sail. Avail. aboard 3 cust. boats.	

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PADI training facility, all major brands.	
Located at exit 2 on I-475.	
DIVING WORLD USA	404/634-4354
2945 Buford Hwy., Atlanta, GA 30329	
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6445 Roswell Road, N.E., Atlanta, GA 30328	
PADI 5 Star Training Facility, air, sales, service, trips.	
Corrective lens center of the Southeast.	
SEA LAB	404/979-8670
Five Oaks Center, 875 Oak Rd., Lawrenceville, GA 30245	
Gwinnett County's Professional Diving Facility.	
Individualized Instruction-Personal Service-Guided Trips.	

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Koko Marina Shpg. Ctr., Honolulu, HI 96825	808/395-8882
"Diving is fun" with Jackie and her friends.	
Scuba resort cert., boats, tours, sales, rental, all cert.	
AQUATIC CHARTERS OF MAUI	808/879-0976
P.O. Box 1028, Puunene, Maui, HI 96784	808/874-0859
Daily dv. Molokini send \$29 U/W video of Maui dv. sites and	
Molokini Crater. VHS/Beta MC/Visa. PADI Instr. U/W video svcs.	
AQUATICS KAUAI	808/822-9213
733 Kuhio Hwy., Kapaa, HI 96746	
Full service, PADI, NAUI, SSI, U/W video taping & photo.	
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CENTRAL PACIFIC DIVERS	800/551-6767
780 Front St., Lahaina, Maui, HI 96761	808/661-8718
Maui's most popular dive operator for over 15 years. 2 & 3	
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DIVE KAUAI	808/822-0452
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Kauai's only PADI 5 Star. Largest sport & commer'l facil., Sales,	
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DIVE MAKAI CHARTERS	808/329-2025
P.O. Box 2955 S, Kailua-Kona, HI 96745	
Diving with a difference—we care! Write to Tom & Lisa.	
Rated Kona's best every year since '76 by Undercurrent.	
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36 Passenger boats daily to Lanai, Maui, Molokini.	
Instruction, open water check outs, photography. Pkgs. avail.	

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Suite 158, 377 Keahole St. #6, Honolulu, HI 96825	
Experience Oahu's best sites: 30' custom boat, instructor	
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FATHOM FIVE DIVERS/KAUAI	800/422-DIVE
P.O. Box 907, Koloa, Kauai, HI 96756	808/742-6991
Specializing in small personal charters, daily trips.	
NAUI and PADI instruction, air, rentals, photography.	
GOLD COAST DIVERS	800/367-8047 ext. 458
75-5660 Palani Rd., #P-1, Kailua-Kona, HI 96740	808/329-1328
Daily personalized dive tours. Specialty charters & classes.	
PADI 5 Star Facility. Pkg. info. for individuals or groups.	
HAWAIIAN WATERCOLORS	808/879-3584
P.O. Box 616, Kihei, Maui, HI 96753	
Experts in dive charters, U/W video, U/W photography.	
Contact Ed Robinson for information.	
KOHALA DIVERS, LTD.	808/882-7774
P.O. Box 4935, Kawaihae Shopping Ctr., Kawaihae, HI 96743	
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Finest diving in the United States.	
KONA COAST DIVERS	808/329-8802
75-5614 Palani Rd., Kailua-Kona, HI 96740	800/KOA-DIVE
Hawaii's only Full On Service Facility.	(for boat
RATED #1 by the LOCALS, "Just ask anyone."	resv. only)
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Daily trips aboard 2 fastest, most comfortable boats in	
Hawaii. Most personable staff. Maui's only PADI 5 Star.	
LEEWARD DIVE CENTER	808/696-3414
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Boat dives—featuring the "Mahi" (WWII minesweeper)	
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MAUI DIVE SHOP	808/879-3388
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MIKE SEVERNS SCUBA DIVING	808/879-6596
P.O. Box 627, Kihei, Maui, HI 96753	
Personalized diving for the comfortable, experienced diver.	
Two to six certified divers only. Contact Mike Severns.	
OCEAN ACTIVITIES CENTER	808/879-4485
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OCEAN ADVENTURES, INC.	808/487-9060
98-406, Kam. Hwy., Pearl City, HI 96782	
PADI 5 Star instructor development center, diver vehicles, tours,	
group pkgs., boat dives, cameras, 3/4 day certs.	
SANDWICH ISLE DIVERS	808/329-9188
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Packages, combo fish/dive charters avail. Undercurrents choice.	
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Our "pampered diver" service will spoil you forever. PADI & NAUI.	
SEA SAGE DIVING CENTER	808/822-3841
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ILLINOIS

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training facility. Central Maine's largest dive shop.	
DIVER'S WORLD	207/725-2531
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HARBOR DIVERS	207/244-5751
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AQUARIUS DIVING CENTER, INC.	617/759-DIVE
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Air, sales, full service, rental, dive travel.	
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National certified instruction, private or group lessons.
Indoor heated pool, full service dive shop.
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BY JERRY ZEBOR

Diving on the north coast of Oregon was not what I expected after moving here from sunny Southern California. I had eight years scuba diving under my belt and many rough water entries, but the spontaneous 10 foot breakers here on the coast were just too much! The active divers are the ones who have adapted to commercial underwater work, and I had made this transition. The jobs of clearing fouled propellers and the occasional damage survey on a grounded freighter built my confidence in low visibility and a self reliant attitude in regard to my skills and limitations. So, when I damaged my BC by jumping some 20 feet off a pier during a survey operation, I wasn't worried, nor did there seem to be any big hurry to replace it. There were second thoughts about this arrangement later, when it was too late.

The handful of active certified divers in this area dive on a voluntary basis for the local sheriff's department and Coast Guard as these organizations do not have emergency divers of their own. It is mostly recovery type work of evidence or victims, sometimes with preliminary damage surveys on derelict or disabled vessels that are potentially dangerous. One day I was drafted into this service.

The excited voice on the telephone was telling me I was the only other diver available and someone was trapped inside an overturned fishing vessel on the Columbia River, near the bar. Information had it they were tapping on the inverted but floating hull and the boat could go down at any time in the 50 foot deep channel. My buddy, David, and I suited up to be transferred by squad car with red lights and siren to Coast Guard Air Station Astoria. We were briefed by a Coast Guard officer as enlisted men stowed our gear on board a waiting Sikorsky HH-3S helicopter. The officer told us the 80 foot fishing vessel *Alotar* had capsized during sea trials with four persons on board. Three men had been rescued, but a young woman and her dog were unaccounted for and assumed still trapped inside. The accident had occurred in the middle of the channel between Astoria, Oregon and Ilwaco, Washington. The tide was slack now, but going into the ebb. Time was crucial as the vessel would surely sink if it floated into the bar area.

We were airborne with the deafening roar of the rotor blades in our ears. About three minutes from the operational area we donned the rest of our equipment. David had a drysuit and an aluminum 80. I had my trusty wetsuit and a steel 72, sans BC. The pilot maneuvered the chopper about 20 yards off the stern of the

capsized vessel and a few feet above the surface of the river. Entry was easy and conditions calm as we made our way to the *Alotar's* stern. The stern ramp looked odd upside down. The nearest Coast Guard boat was about 300 yards away and the channel at this point is about five miles wide. We were right in the middle of it and when the helicopter lifted off my buddy and I were quite alone. We exchanged instructions as to line pull signals. David stayed on the surface and tended as I took the one-half inch line by the bitter end and followed the bulwark down and under the gunwale until I could see and feel the deck planks. The scene was a bizarre mass of shifting planks, loose rope, drifting net and leaking oil. Through the five foot visibility it was obvious the *Alotar* was going into death throes. Planks would frequently be dislodged and snap past me on the way up. Drifting material would float this way and that in the mild surge. I was unfamiliar with this vessel and it was difficult to maintain orientation.

I moved forward to the wheelhouse. In so doing, my legs and fins became fouled in lightweight net mending material. I could not kick free but the sturdy dive knife on my calf easily solved the problem. I continued on, gently pushing the tangled mass of rope and debris away from me. More of the stuff fouled my arm and pressure gauge. When I went for my knife, it was gone. My only cutting tool was lost! I removed the line from my arm and gauge and made a decision to be more cautious.

When I got to the wheelhouse, the door was locked. I pressed my mask against the window and pointed my light inside, but all that appeared were reflections and grotesque shadows in the blackness. I moved around the backside of the cabin to the opposite side of the wheelhouse. At this time, my low pressure audio reserve gave the first low moan and a check of my pressure gauge confirmed only 300 psi left. I saw an open window. No way could I fit through it with my tank on, nor did I want to. But, when I peered in, I saw a pant leg and a tennis shoe. There was no response when I tugged on the pant leg. I was too late! My audio reserve was blasting full force now. I manipulated the body until I was able to pull the head and upper torso out of the window.

The tangled line was easy to remove from the young woman's waist. As I pulled her completely out the window my audio reserve was sounding that discordant note and I welcomed the increasing light as I made for the surface.

Topside, conditions had changed. The tidal river was well into the ebb and really ripping.

In the excitement upon finding the girl, I had dropped the tending rope and there was no way for me to signal my buddy at the stern. I was far forward starboard and he was out of sight. I pulled the regulator out of my mouth and yelled, hoping my voice would carry over the noise of the water. It did, and several minutes later my buddy popped around the hull and made his way toward me. Attempts at breathing with my snorkel were difficult. Small, irregular chops kept flooding the tube. It was hard to maintain control over the girl's body and breathe freely. David took the girl and I saw them float away with outgoing current.

I struggled to the stern of the boat and noticed it was slowly spinning and moving out to sea. Where was the Coast Guard? A rescue boat picked up David and the girl about 500 yards out. There were several other vessels in the area, why didn't they come and pick me up? The hull was slippery. I was out of air and fighting negative buoyancy, fatigue and nausea. I had no BC. Should I ditch my weight-belt? I opted to wait a few more minutes. Then the nausea really hit me. OK, it was time to ditch the weightbelt. If the Coast Guard had forgotten about me, I would ditch my gear and ride the current out and try and snag myself on one of the long jetties that bracket the bar.

At about that time, one of the Coast Guard vessels was getting bigger. Hurry up! Wish I had a BC to inflate. I vomited. What seemed like an eternity later, two Coast Guard crewmen were hauling me aboard with a mooring hawser. We watched as the *Alotar* twisted and turned, listed to port and belched out oil, wood and debris, finally coming to rest on Clatsop Spit sands.

To say the least, this was the most hazardous dive I have ever made. Fortunately for me, I can relate some hard learned lessons that may help others. First, always dive with a BC. This is a basic rule taught in all scuba classes. However, overconfidence can provide an alternate sense of false buoyancy that might catch you by surprise.

Second, if the possibility of entanglement exists, carry two knives and make absolutely sure they cannot be lost. The back-up knife need only be a folding type. It could save you in a jam. If it is a folding type, make sure you can open it with gloves on.

Finally, if you are involved in water rescue type operations, plan and practice every possible type of situation your group might encounter. Underwater rescues do occur. Rescue divers have also drowned. Prepare now if you value safety. 

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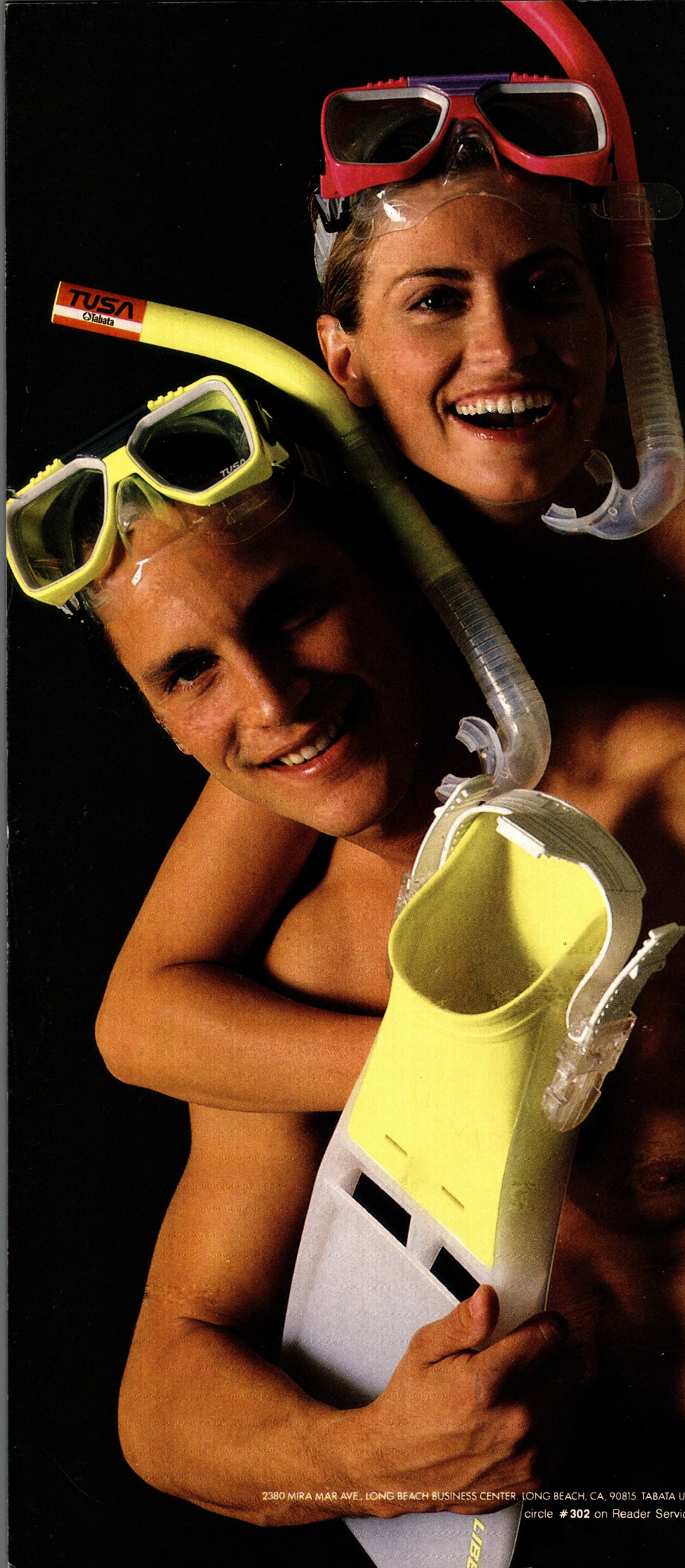
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